NATIONAL PETROLEUM NEWS

Refining Technology

EDITION

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FEB 10 1938
DETROIT

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REGIONAL WAREHOUSES STRATEGICALLY LOCATED FOR PROMPT SHIPMENT

O. B. Lloyd

● O. B. LLOYD moves up to the position of general sales manager of the Continental Oil Co. after several promotions in the sales department of that company, in which he has spent 17 years. At one time earlier he had his own business specializing in lubricants. In 1926 he became assistant division manager of the northern division of the company, with headquarters at Hammond, Ind. Next he was manager of this division, then sales promotion manager of the retail marketing department, assistant general sales manager and next northern sales manager. His headquarters will be at Ponca City, Okla., Continental's home office.

News By Teletype From 4 News Bureaus

National Petroleum News

News From Oil Industry Everywhere

VOLUME 30 WEDNESDAY, FEBRUARY 9, 1938 NUMBER 6

Emergency Brings Cut In Oklahoma Crude Allowable

N. P. N. News Bureau
By LAWRENCE E. SMITH

TULSA, Feb. 8.—An emergency order cutting Oklahoma's allowable crude oil production has been prepared by W. J. Armstrong, chief conservation officer of the Oklahoma Corporation Commission, it was learned today.

The absence from the state capitol at Oklahoma City of a majority of the members of the commission indicates there will be a delay of a day or so in the consideration of the order.

Armstrong, who has spent the past week in an investigation of the crude oil situation in the state, believes the amount of the emergency reduction over the rest of the month should be 35,000 barrels daily, to an even 500,000 barrels daily for the state.

The attitude of crude oil purchasers towards this proposal is not known There is some doubt, however, as to the method of procedure, for the Oklahoma law carries a general requirement of 10 days' notice for a public hearing to be held prior to the issuance of an order.

Demand for crude oil continues to drop and at the end of last week the Oklahoma Corporation Commission was considerably worried at the possibility of the spread of pipeline proration. That practice is continuing extensively in Kansas.

One large buyer of Oklahoma crude is on the point of putting in its own proration schedule in pools where it buys and that possibility is bothering the state commission which has tried hard to keep the supply in balance with demand. This purchaser has experienced restriction of deliveries to its refinery customers and it must either pass this along to the producers or put crude into storage extensively.

During the past summer Stanolind Crude Oil Purchasing Co. found itself unable physically to handle, for its connections in Kansas the oil which the Kansas Corporation Commission was legalizing in its orders. The company's affiliated carrier, Stanolind Pipe Line Co., lacked capacity to move all the allowable from leases in Ellis county to which it was connected. So, the purchaser announced it would buy only a certain per cent of the allowable. It has continued to do this month after month. Its present purchases from Ellis county leases are 85 per cent of the commission's allowable. The same percentage was used in January.

Kansas purchasers either an-

(*Continued on page* 20)

$100,000 For First Oil Well In Mississippi

JACKSON, Miss., Feb. 7.—One hundred thousand dollars' reward for an oil well!

Senator Mack Young proposed in a bill introduced in the legislature to give the governor authority to draw $100,000 out of the state treasury for prize money to the first person bringing in a commercial oil well in Mississippi.

Henry N. Toler, state oil and gas supervisor, said the hunt for oil already was under way, "but no doubt Senator Young's prize would spur other activity."

Toler said the first drilling for oil in Mississippi occurred in 1903 and resulted in a "dry hole" in Clarke County. Drillers, small and large, have been at it sporadically with little success ever since, he stated.

Recent discoveries of salt domes in Lamar and Hines Counties accelerated the hunt.

FDR MEMO TO CONGRESS MENTIONS TAX ON CRUDE

President Says Diminishing Oil Reserves Is 'Alarming'; Boland 'Encouraged' At Fuel Oil Tax Prospects

By Teletype
N. P. N. News Bureau
WASHINGTON, Feb. 8

Congressman Patrick H. Boland, Scranton, Pa., author of the bill to tax at one cent a gallon all fuel oil used for heat or power, today said he took "great encouragement" from a memorandum received from President Roosevelt indicating interest in the bill.

President Roosevelt cited a report on oil reserves, adding that the situation is "somewhat more alarming than I had previously believed."

The memorandum that Boland received was a copy of a similar communication sent to Chairman Doughton of the Ways and Means Committee, to which the fuel oil tax bill was referred when introduced last year.

Study of the memorandum's text, however, indicates that it may have tipped off the Administration's plans for a broader tax than just a levy on fuel oil—a federal tax on crude oil.

In the memo, the President referred to the suggestion for "placing a small tax on crude petroleum."

This may have been just a slip of the pen—and again it may have given an insight into the Administration's tax plans.

One of the Administration's major objectives at this session of Congress is revision of the tax laws. In casting around for new sources of revenue, maybe some of the Treasury experts have in mind a tax on crude, it was pointed out.

Such a tax, of course, would satisfy Mr. Boland's coal-constituents and John L. Lewis' mine workers union, which last week endorsed the fuel oil tax bill as a measure to "equalize" competition with coal.

Text of FDR Memo

Complete text of the President's memorandum follows:

"I am sending you herewith for your information a copy of the estimate of petroleum reserves in the U. S. which has just been prepared by the Petroleum Conservation Division of the Department of the Interior. This report was prepared for the conference of governors of the oil-producing

'Saddle My Cayuse' Will Give Way To 'Fill 'er Up' on Range

N. P. N. News Bureau

WASHINGTON, Feb. 7.—Feed bills for the "critters" Uncle Sam's range riders will use this spring to cover the 120,000,000 acres of federal range land will be payable, not to the purveyor of hay and oats, but to the supplier of gasoline and oil.

For, the Interior Department announces, the riders will be mounted behind steering wheels most of the time instead of astride saddles.

Plans have been formulated, the grazing division announced, for the range rider to hit the trail in an automobile, with his favorite horse enjoying the scenery from a trailer, ready to take up its share of the transportation burden where the auto road ends. The federal range covers about 10 western and southwestern states.

In addition to aiding the federal men to supervise movement of hundreds of thousands of sheep from winter range to summer feeding grounds, the motorized ranger service will provide more effective means for combatting depredations of the new style rustler—dubbed "gasoline cowboy"—who uses a speedy motor truck to haul away beef and mutton cut from animals killed and cut up while grazing on the federal range, according to the department, whose announcement of the changeover, in an effort to be colorful asserts:

"The patter of horses' feet will be supplemented by the putter of motor cars, when . . . . . etc."

states, held at Hot Springs, Ark., Jan. 24, 1938.

"I am enclosing one copy of the report on this oil conservation conference made by Mr. E. B. Swanson, the associate director of the Petroleum Conservation Division of the Department of the Interior.

"This is sent to your committee because there has been raised the question of placing a small tax on crude petroleum, not only for the purpose of producing revenue, but also for the purpose of conserving our oil resources, both for the use of industry and for national defense.

"The report in regard to reserves is somewhat more alarming than I had previously believed. For instance, present drilled reserves are estimated to be capable of supplying demand only until November, 1941, and to meet expected demand during 20 years to come it would be necessary, in addition to production from known reserves, to discover 28,000,000,000 barrels of new oil. Such new discoveries would have to be made at a rate of discovery greatly exceeding discoveries made during the past seven years."

The report on petroleum reserves, mentioned in the memorandum, was the one presented at the oil-states conference by Alex W. McCoy, Ponca City (Okla.) geologist. (See, N.P.N., Jan. 26, Page 21)

Swanson's report on the Hot Springs conference, sponsored by Governor E. W. Marland of Oklahoma, was not made public. Swanson attended the conference as an observer for the federal government.

There were indications late today that the White House was somewhat displeased over the President's memorandum "leaking out."

Only the day before, Doughton, the Ways and Means Committee chairman had stated that there was "little interest" in the fuel oil tax bill and he doubted that it would come up at this session of Congress.

Congressman Boland, accompanied by Senator Joseph H. Guffey and Congressman J. Harold Flannery, both also from Pennsylvania, called on President Roosevelt a week ago to urge Administration support for the fuel-oil tax bill, telling the Chief Executive that it would bring in $168,000,000 in additional revenue as well as aid in conserving petroleum resources, which Boland described as a "waning resource."

The President said he had turned over the facts given him by Boland to the Bureau of Mines and the Petroleum Conservation Division of the Interior Department, with a request for information as to petroleum reserves.

The McCoy report apparently was sent the President in response to this request, and he forwarded it on to Chairman Doughton, with a copy for Boland, who represents an anthracite district.

To Hear Kentucky Case

N. P. N. News Bureau

WASHINGTON, Feb. 7.—U. S. Supreme Court has noted "probable jurisdiction" in the appeal of Petroleum Exploration, Inc., from a Kentucky state court decision holding the company, which is engaged in producing and transporting natural gas, subject to the Kentucky Public Service Commission.

Prominent Oil Chemist Dies In Franklin

FRANKLIN, Pa., Feb. 7.—Dr. P. H. Conradson, internationally known petroleum chemist, died here Jan. 21, at his home, where he had been living in retirement for the last ten years.

Dr. Conradson came to this country from Sweden in 1880, and at the time of his death was in his 87th year. He was best known in this country for the laboratory test which bears his name, the "Conradson Carbon Residue Test," which is standard in this country for determining the carbon residue characteristics of lubricating oils, under the American Society for Testing Materials Designation D189-36. For many years he was prominent in the activities of this society.

Dr. Conradson was born in Sweden in 1851, and is a direct descendant of a 12th Century Swedish king, Eric The Holy and a long line of Swedish nobility. He came to America in 1880, after graduating from the College of Pharmacy and Chemistry of Stockholm, in 1875. From 1880 to 1896 he obtained a wide experience in various organizations and he established the first railroad chemical control laboratory in New England in 1888. In 1896 he joined the staff of the Galena Signal Oil Co., as chief of its Bureau of Tests and Lubrication. Galena was then the largest supplier of lubricants in the world. Since that time he has become internationally known for his work in lubrication which included his best known work on testing methods.

He is survived by a brother residing in Sweden, and by several nieces and nephews in this country and abroad.

Mich. Trade Law Unconstitutional Is Court Ruling

DETROIT, Feb. 8.—The fingers of the state fair trade practice law pushed into mitten-shaped Michigan during the past week and found a wasp.

Dealers in Grand Rapids brought suit under the law against two dealers who offered trading stamps at their stations, but Judge Verdier, a Grand Rapids county circuit court judge, dismissed the case, holding the fair trade practice law was unconstitutional because it concerned only the petroleum and baking industries to the exclusion of the others.

Rankin P. Peck, secretary of the Retail Gasoline Dealers Assn. of Michigan, an organization fostering and assisting in the enforcement of the fair trade law in the Detroit area, expressed the opinion this decision would have little influence on the current efforts to establish the constitutionality of the law in the Wayne county (Detroit) district.

Peck said that his organization will continue its fight against what he charges are major companies' price discriminations to certain dealers. He said that, at a meeting of his association held Feb. 7, a tentative plan had been underwritten by 200 local dealers whereby the radio will be used to carry the dealers' story to the public, in effect that, if all dealers were given the same deal that certain favored retailers receive from suppliers, the price of gasoline to the consumer could be reduced.

"Our only complaint against the majors", Peck said, "is in their discriminatory price to certain dealers or agents, which is undermining the small dealer's business."

New Suit Started

A new suit was started this week in the adjoining county of Oakland, when an independent group of Royal Oak dealers asked for an injunction restraining a retailer in that town from selling gasoline at 4 cents under the regular price and giving away 2-pound packages of sugar with purchases at the station. On Feb. 11 this dealer is to appear in court to show cause why such an injunction should not be issued.

In Detroit, the premium case of the dealers association vs. Victor Miller will again come up Feb. 21, when a motion will be heard to set the date for trial. Other cases against premium givers are also scheduled for hearings on that date.

Early in December, the Argo Oil Co., Detroit, charged with selling gasoline below cost in violation of the state fair trade law, obtained a restraining order prohibiting the county prosecuting attorney, the local police department, and the retail dealers association from attempting to enforce the law until it had been proven in court on its merits. This order is still in force.

Roy Fisher Comments

Roy R. Fisher, president of Argo and also of the National Oil Marketers Assn., issued the following statement to NATIONAL PETROLEUM NEWS to support his stand in the matter:

"The whole situation is an outgrowth of conditions brought about by a handful of individuals, who because of their own inability to intelligently handle a very simple problem, saw fit to resort to methods of tyrannical, bull-dozing and intimidating operations, and it was only natural that we sought the protection of the courts in a restraining order to minimize these tactics.

"My company is in favor of proper price structures and an equitable, competitive market, and further, we *did not* reduce our posted prices on gasoline until we were forced to do so by the very individuals who today are complaining so bitterly about the chaotic conditions they themselves brought about. Regardless of the present court battle, this company stands ready and willing at all times, to co-operate in a manner that would be efficient, proper, and equitable in this area."

Crude Output Rises 16% in 1937

N. P. N. News Bureau

WASHINGTON, Feb. 8. — The Bureau of Mines reported late today that its preliminary figure for total production of crude in 1937 was 1,277,653,000 barrels, sixteen per cent above the final 1936 total of 1,099,687,000 barrels.

Domestic demand for motor fuel in 1937 was 518,760,000 barrels, or eight per cent larger than 1936. Gasoline stocks at the close of the year were 76,990,000 barrels compared with 62,914,000 barrels on hand the year previous.

Total demand for gas oil and distillate fuels increased 20 per cent, from 102,757,000 barrels to 117,377,000 barrels. Kerosine demand climbed from 51,428,000 barrels to 54,951,000 barrels.

Chicago Stations Are 'Stabilized' In Chicago Style

N. P. N. News Bureau

CHICAGO, Feb. 7. — Retail price stabilization in Chicago, where first and second grade gasolines are quoted openly up to 4-cents off, is now being handled in typical Chicago fashion.

Violence has become a stabilization factor. Police were informed that men claiming to be connected with the truck driver's union have taken a hand in price maintenance through telling retailers to sell at the posted price or deliveries will be stopped.

A retailer was reported beaten late last week on Chicago's northwest side following a visit from a man claiming to be a truck drivers' union agent concerning a price sign.

The retailer reported he was told in the afternoon to remove a sign advertising 6-gallons for $1. The sign was removed, but displayed again that evening when sales slumped.

While he was alone that evening three men entered the station, struck him on the head with a gun and then kicked and beat him, the retailer complained. He was given hospital treatment later.

Another retailer, on the northwest side, informed police he was visited by a man claiming to be a union agent and told to remove a "4-cents off" sign or deliveries would be cut off. He removed the sign.

Chicago has long been a hotbed of retail gasoline price cutting. Before the code discounting flourished through secret cuts, also through a price reduction on motor oil drains with a lubrication job.

Market Demoralized

After the code, and with the coming of the company station leasing policies retail price conditions have gradually become more demoralized. Premiums and open price cutting flourished. By now the "2-cents off" signs have given way to advertisements for 3 and 4-cents off. In suburban areas where prices previously were fairly well maintained the price signs are appearing in front of stations.

The price cutting applies to widely advertised refiner brands. Some price signs announce the discount applies to purchases of 4 or 5-gallons or more, and some advertise the discount on cash sales. Discounts are on first and second grades.

Reports have been current of several plans by retailers to stabilize the price, not in setting the price but in endeavoring to have retailers sell at the price posted. At the last legislative session retailers sought a law requiring retailers to sell at the posted price. While stabilization was being rumored, price cutting continued.

The posted retail price on second, or house-brand, gasolines has been 19 cents for several years. On downward fluctuations of the tankwagon price to dealers, the retailers have stood pat thus increasing the margin.

Posted dealer tankwagon price, on second grade gasoline, now is 13.3 cents, including the 3-cent state and 1-cent federal taxes. With a posted 19-cent price the spread in Chicago is 5.7 cents, on sales made at 19 cents.

'Mixed Carloads' Case Is Postponed

N. P. N. News Bureau

WASHINGTON, Feb. 7. — Hearings on the "mixed carloads" case have been postponed by the Interstate Commerce Commission, and, instead of being held in Chicago on March 21, as originally scheduled, they will probably be held at Omaha at a later date.

The hearings were scheduled before an ICC examiner at Chicago at the same time as hearings on the half-dozen cases challenging the estimated weight of 6.6 pounds per gallon used by railroads in assessing transportation charges on petroleum products, but were postponed when it was discovered by the ICC that the mixed carloads case involved different issues.

The mixed carloads case, filed by Aderhold & Ellison, De Smet, S. D., and a group of about 30 other jobbers in the midwest, attacks the railroad tariff regulations which base charges for an entire carload of petroleum products (in a compartment tank car) on the highest rate for any product in the car, and at the same time base the weight upon which the charge is figured on the highest estimated weight applicable to any product in the car.

Meanwhile, Standard Oil Co. (Nebr.) has intervened in the Aderhold case, along with several other oil companies who say their freight charges will be affected.

'Little Businessmen' Tell FDR What They Dislike In New Deal

By G. T. KELLOGG

N. P. N. News Bureau

WASHINGTON, Feb. 7. — Heralded as a "stacked" performance, last week's meeting of so-called "smaller" business men of the country defied its advance billing, bowed its collective back at all intimations it might have been selected as a yes-men's convention, took several healthy licks at some of the New Deal policies (at the same time endorsing others), and let the chips fall wherever they landed.

The oil industry was represented by a scattering of producers, refiners, jobbers and dealers. A group of the jobbers took an active part in anti-trust law discussion. The national dealers' association telegraphed President Roosevelt protesting "our type of marketer" was not represented.

The conference opened with one of Washington's greatest exhibitions of simultaneous oratory, but after the "crackpot fringe" had exhausted its kit bag of panaceas, or had been otherwise subdued, the meeting settled down to be a reasonably constructive sort of gathering.

Some of the things it demonstrated to the administration, whose not-too-bright idea it was to call the meeting, were:

1. That American business is a huge proposition — not just a few "princes of privilege" at whom the finger of administration scorn may be pointed when necessary to rouse the "masses".

2. That business feels, perhaps subconsciously, now, that it has become subject to the whims of "the government", and that whether it may live or die depends in large part on what happens or doesn't happen in Washington.

3. That groups of individuals cannot be segregated by such common-denominators as "big business", "small business", "capital", "labor", "professions" and such appellations — that individuals retain their individual philosophy, regardless of their classification, and that no group whose sole binding feature is one of the above designations can be regimented to be exponents of a particular philosophy, entirely different from that of any other group of individual Americans, merely because they happen to be herded under any other of the several blanket denominations.

4. That, despite attendant confusion, such a gathering of business men could make clear its feelings — but that, aside from one or two items, these feelings were much akin to those which have been expressed by all business, large and small, for months.

Chief divergence from the recommendations of "big business" was the insistence of several of the 10 groups into which the little men were divided upon strict enforcement of the anti-trust laws, and, if necessary, strengthening of these laws by further legislation. In this category might also be placed recommendations for strict enforcement of the Robinson-Patman anti-price discrimination law and Tydings-Miller law permitting resale price maintenance contracts.

Against Profits Tax

Another virtually unanimous feeling expressed by the "little" men was that the undistributed profits tax was crippling all business, large and small, but particularly the smaller organizations.

Again, like most all employers, they felt that the government should drop all proposals for wage-hour legislation. They also thought that labor should accept a certain amount of responsibility for observance of contracts.

Smaller businesses need credit to keep running, but they want to get it from banks, not from the government — although they think the government might do something about making it easier for them to get bank credit, they said.

Another suggestion was that the government should stop issuing tax-free securities, with which was coupled the thought that federal and state government employes should be divested of their "exempt" character when it comes to paying state and federal income taxes.

A fireside chat from the White House assuring business that the administration orators would drop their attacks on business and that the admin-

Another Conference Proposed

MILWAUKEE, Feb. 8.—The National Assn. of Petroleum Retailers is considering a proposal to President Roosevelt that another "little business" conference be called. with representation this time based on trade associations, it was announced here late today at N.A.P.R. headquarters.

istration would adopt the role of "co-operator" rather than "persecutor" also was suggested as a possible means toward the end sought by all, presumably — recovery from the "Roosevelt recession."

The little business men thought, too, that the administration ought to clarify its position as to the desired price levels it hoped to achieve — whether the "ideal" price level was that of 1926, or that of 1913, or what.

The suggestion was also made that a permanent organization of small business, similar to the Business Advisory Council, be set up to confer with the administration on policies affecting business.

If the recommendations of the conference represent the viewpoint of all "little business", then it is apparent that it is, for the most part, in accord with that of "big business" on the need for certain governmental action or non-action.

Many of the recommendations have been heard in Washington for months, but have not been given serious thought because they came from the "big industrialists" and were stigmatized by the administration as representing Liberty League ideals.

To carry out many of these recommendations, the President will have to offer a direct challenge to organized labor, as well as to scuttle some of his administration policies.

Present Demands To FDR

In presenting the resolutions of the 10 groups to the President, the 12 spokesmen for "little business", headed by Fred Roth, Cleveland wholesale shoe dealer, told him that they still had faith in his leadership, but urged prompt action on the program. It may be added that the final form of the recommendations as presented to the President had some of the sharper edges hewed off the form in which they left the group meetings.

After the group of 12 had left, White House secretary Stephen T. Early reported the President found the exchange of views constructive, and that while some of the recommendations were feasible, others sounded well but were impractical. Early did not say which of the recommendations the president regarded as sound.

Jobbers Join Parley Group

WASHINGTON, Feb. 7. — Most active part played by any oil industry group in deliberations of the conference of "smaller" business men here last week was that taken by a handful of jobbers, led by Paul E. Hadlick, secretary of National Oil Marketers Assn.

Hadlick and the jobbers decided to join the group discussing "fair trade practices and price legislation" when the conference broke up into 10 separate meetings, and their efforts were reflected in the resolutions brought in by that group for presentation to the President.

Among those who accompanied Hadlick to the meeting were Richard E. Breed, Baltimore, who, although not specifically invited to attend, became a delegate after arriving in Washington on other business; John J. Cox, Marshall, Mich.; Charles J. Hallman, McGlynn Oil Co., Minneapolis, and G. D. Givens, Home Oil & Gas Co., Henderson, Ky. Two gasoline dealers also joined the fair trade group—Victor Mangeney, Jr., Glassboro, N. J., and H. L. Barney, Berlin, Conn.

Hadlick, Breed and Hallman said after the conference that they felt the dominant note of the entire meeting was the desire of the "little" men for strict enforcement of the anti-trust laws.

Russell B. Brown, representing the Independent Petroleum Assn. of America and Hope Oil & Gas Co., Fort Worth, Tex., also attended this group meeting.

Most of the other oil industry representatives registered at the conference could not be located, largely because of the confusion attendant upon the meetings. They included Jeff Davis, Lion Oil Refining Co., Eldorado, Ark.; Edward Nouch, Evanston, Ill., dealer; Laurence F. Magness, Baltimore jobber, A. V. Bourque, Western Petroleum Refiners' Assn., J. G. Buell, Tulsa, and Ralph S. Buell, Narberth, Pa., fuel oil dealer.

Among the recommendations to the president of the group participated in by the jobbers were the following:

1. That non-profit organizations (co-ops) should not be given special favors by government.

2. That selling to employes in competition with regular trade channels be considered untair trade practice.

3. That Robinson-Patman and Tydings-Miller Acts be rigidly enforced.

4. That principles of state fair trade practice acts prohibiting selling below cost be approved.

5. That chain store competition is hurtful to orderly progress of retail business, and that new Patman chain store tax bill (which would tax chain stores out of existence) be approved.

6. That states be permitted to tax inter- and intra-state business on same basis.

7. That Patman bill to divorce manufacturer from retailing be approved.

8. That an expression from the administration as to what price level it seeks to attain "would be appreciated."

9. That the meeting endorse a resolution calling upon the government "to appropriate sufficient funds for the Department and the Federal Trade Commission to promptly and vigorously enforce existing anti-trust laws" and recommending a revision of the anti-trust laws to "first, clarify the practices which must be eliminated, and, secondly, greatly increase the penalties upon violators of such amended laws."

Detroit Dealers Disown Schuh Telegram

DETROIT, Feb. 8.—Detroit dealers will have none of Mr. Schuh's telegram to President Roosevelt. In a resolution passed at a closed meeting of the Retail Gasoline Dealers Assn. of Michigan here Feb. 7, Schuh and his now-famous telegram were unanimously condemned on the grounds that the local dealers were not all in accord with his sentiments and that he spoke as a representative of all the dealers without bothering to consult them about his action. And what is more, the Detroit dealers' resolution will also be brought to the President's attention, according to Rankin P. Peck, executive secretary of the local dealer group.

Business Fundamentals On Indiana Program

INDIANAPOLIS, Feb. 7.—An "anti-recession" recipe in his talk on basic business philosophy is promised by Robert M. Bowes, president, Bowes "Seal Fast" Corp., Indianapolis, who will be one of the prominent speakers at the Spring convention of the Indiana Independent Petroleum Assn.

This convention will include a refiners and equipment makers exhibit and will be held at the Hotel Severin here, March 2, 3 and 4, according to R. M. Stith, Stith Petroleum Co., president.

Another speaker tentatively announced is Barclay Acheson, associate editor of "Readers Digest." Other speakers have not yet been announced due to the fact that jobbers themselves are taking an active part in formulating the program and numbers of changes are being made.

J. E. Fehsenfeld, who made such a hit last fall with his "miniature Monte Carlo," is again entertainment chairman, but none of the plans are to be announced, Stith said.

300,000 Dealers Not Represented, Schuh Tells FDR

MILWAUKEE, Feb. 8.—The telegram to President Roosevelt of Wilmer R. Schuh, president of the National Assn. of Petroleum Retailers, protesting that "our type of marketers" were not represented at the "little business" conference last week in Washington, was still unanswered this afternoon.

Schuh, when he sent the telegram to the White House Feb. 3, declared that "it is high time that the powers that be made certain those that are invited to represent small business are not of the wrong kind. The only oil men invited to Washington that we know of cannot represent the petroleum retailers of this country. We want to cooperate and be helpful but we will not tolerate having those people speaking for our retailers."

Schuh Telegram

Text of Schuh's telegram as N. A. P. R. president, follows:

"Mr. President: Can you imagine a genuine conference of small business men without any representation of the 300,000 so-called legitimate petroleum retailers with over $2,000,000 invested capital and doing over $4,000,000 retail business annually and employing over 1,000,000 persons.

"For your information we are the largest group in the oil industry and the largest group of involuntary tax collectors. We were completely ignored in the first formation of the NRA Code. We have been arbitrarily denied a voluntary code by the FTC as recently as last September and once more have been completely ignored in the conference of small business men.

"The oil men attending the conference do not represent our type of marketer. Has the administration embarked on a program of keen unrelenting competition? Our business going into tailspin with sagging markets since Madison decision. Price wars are becoming more prevalent every day. How long are we to be orphans of the storm? We are looking to you for help. Reply Western Union."

Talks on Jobber and Dealer Problems Listed for Illinois Meeting

SPRINGFIELD, Ill., Feb. 5. — The two-day convention of the Illinois Petroleum Marketers Assn., to be held Feb. 16 and 17 at the Pere Marquette Hotel, Peoria, will be divided between jobber and dealer sessions — the jobbers meeting the first day and the dealers the second. A program specially suited for each branch has been prepared, according to G. A. Primm, secretary.

Speakers for Feb. 16, jobbers' day, will be:

J. S. Keller, Chek-Chart Corp., Chicago, whose talk, "Increase Your Net Profits" is based on actual experience in selling petroleum products and in contacts with Independent jobbers.

O. J. Junkhan, Sweney Gasoline & Oil Co., Peoria, who will talk on the timely subject, "The Illinois Unemplyoment Compensation Act — And Its Application", is an accountant familiar with all tax laws as they apply to the petroleum industry.

Warren C. Platt, editor and publisher, NATIONAL PETROLEUM NEWS, will talk on Independent jobbers' current problems, such as the gasoline tank car market, handling national or individually branded petroleum products, and outlook for the future.

Program for Feb. 17, dealers' day, is:

"The Gasoline Retailer's Problems and This Changing World," by C. E. Ragan, president, Gasoline Retailers Assn. of Metropolitan Chicago, and director, Illinois Gasoline Retailers Assn. This talk will discuss over-building of service stations, commercial distribution of gasoline, chiseling, and price posting and fair trade laws.

The annual banquet, enlivened by a floor show and dance, will be held Feb. 16. Ladies are invited.

Kentucky Jobbers Elect

By Telegraph

LOUISVILLE, Feb. 8. — The 12th annual convention of the Kentucky Petroleum Marketers Assn. opened at the Brown hotel today with a directors' meeting and election of members of the executive committee.

The members of the executive committee, all re-elected, are T. O. Baucum of Murry, Jackson Oil Co., chairman; John Hays of Bloomfield, Regal Petroleum Co.; R. A. Miller of Elizabethtown, White Star Oil Co.; C. E. Bower of Louisville, Continental Oil Co.; and S. G. Courtney of Lexington, Power Oil Co.

Business sessions, election of officers, a number of addresses and banquet will close the convention tomorrow.

Grease Selling, Tractors Lead Kansas Program

WICHITA, Feb. 7.—Talks ranging, literally, from down-to-earth tractors to psychological studies such as Tom Collins, Kansas City Journal Post, will give in his banquet speech "Why People Don't Like Us," form the diversified program of the 24th annual convention of the Kansas Oil Men's Assn., meeting at Wichita, at the Hotel Broadview, Feb. 14 and 15.

Other subjects and speakers are, according to C. E. Holmes, secretary:

Feb. 14, Afternoon

"Merchandising," by Kenneth W. McFarland, educator.

"How to Make A Grease Sale," by Ralph R. Matthews, and Arthur Evans, Battenfeld Grease & Oil Corp., Kansas City.

Feb. 15, Morning

"Legislation" by Judge Walter E. Brown, chairman, Kansas Petroleum Industries Committee.

Afternoon

"More Power for Your Tractor," by H. L. Nixon, Ethyl Gasoline Corp.

"Farm Credits," by Dudley Doolittle, Farm Credit Administration.

Entertainment at the first day's luncheon will be through courtesy of the Southwest Grease & Oil Co., Wichita. A floor show and dance will follow the banquet the evening of the first day, and a league hockey game between the Wichita Skyhawks and Tulsa Oilers will be viewed the second evening. There will also be an equipment and petroleum products exhibit.

Ohio Jobber Program Lists Holliday

COLUMBUS, Feb. 7.—W. T. Holliday, Cleveland, president of Standard Oil Co. (Ohio), will be the principal speaker at the 15th annual convention of the Ohio Petroleum Marketers Assn., meeting in Columbus at the Hotel Deshler-Wallick Feb. 22, 23 and 24. Mr. Holliday will speak at the special luncheon the last day.

Other speakers and their subjects are:

February 22

Zenn Kaufman, Dale Carnegie Institute, New York, "Use Showmanship to Build 1938 Profits."

F. R. McLean, safety and insurance department, White Star Division, Socony-Vacuum Oil Co., Inc., Detroit, "Safety Lessons from Marketing Department Accidents."

Lynton H. Rogers, Lorain, president of the association, will give the president's message.

February 23

E. J. Gallmeyer, Wayne Pump Co., Ft. Wayne, Ind., "What Is This Thing Called Salesmanship?"

F. W. Lovejoy, Socony-Vacuum Oil Co., Inc., New York, "Merchandising Problems of the Petroleum Marketer."

Thurman "Dusty" Miller, humorist, Wilmington, O., "Attitudes."

The convention sessions are in the afternoons only. There will be a marketing exposition, a banquet, show and dance the evening of Feb. 23, and the association's annual meeting the afternoon of Feb. 22.

Michigan Jobbers Plan Annual Meeting

PORT HURON, Mich., Feb. 7. — The annual meeting and trade exhibit of the Michigan Petroleum Assn. will be held at the Statler Hotel, Detroit, March 24 and 25, according to J. F. Wilson, The Star Oil Co., Inc., Port Huron, association president. This will be the third annual meeting for this reorganized association of jobbers and marketers.

Let N.P.N. Be Your Eyes and Ears At Nine State Jobber Conventions!

● In the next few weeks many hundred independent jobbers will leave their desks to take part in the annual meetings of their state associations. In that period nine conventions of state marketing associations will be held, most of them in the middle west, stronghold of the independent oil jobbing industry. But very few jobbers, however, will be able to attend more than one state convention.

Oil marketers appreciate the importance of these association meetings, even those who are unable to attend. There the newest problems of the jobbers are discussed. What the jobbers are talking and thinking about is reflected in the talks and discussions. More than that, however, the meetings of the marketers' associations are the best place to get the "feel" of this branch of the oil industry, to sense its new trends and developments.

For oil marketers everywhere, NATIONAL PETROLEUM NEWS, through its own staff writers, in its coming issues, will bring the reports and discussions from these state meetings to its readers' desks faithfully, accurately, seasoned by its many years of experience in writing of oil marketing problems and happenings. Its articles will be more than reports of convention proceedings; they will give something of the "feel" of this branch of the oil industry, now at the threshhold of its active season of the year.

Here is the schedule of these coming state jobber association conventions, as they will be "covered" by NATIONAL PETROLEUM NEWS' own writers:

Feb. 16th issue—The Kentucky Petroleum Marketers Assn., Louisville, Feb. 7-9, and the Missouri Independent Oil Jobbers Assn., Kansas City, Feb. 9 and 10.

Feb. 23rd issue—The Kansas Oil Mens Assn., Wichita, Feb. 14 and 15, and the Illinois Petroleum Marketers Assn., Peoria, Feb. 16 and 17.

March 2nd issue—The Ohio Petroleum Marketers Assn., Columbus, Feb. 22-24, and the Wisconsin Petroleum Assn., Milwaukee, Feb. 22-24.

March 9th issue—The Indiana Independent Petroleum Assn., Indianapolis, March 2-4, and the Iowa Independent Oil Jobbers Assn., Des Moines, March 2-4.

March 30th issue—Meeting of the Michigan Petroleum Association, Detroit.

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Coal Fights For Regulation Of The Oil Industry

By WARREN C. PLATT, Editor

Let there be no doubt in the minds of oil men that the coal industry is fighting hard to put the oil industry under government control both as to operation and as to price. The battle at the moment is on the price of fuel oil but once government undertakes to regulate that for the benefit of a competing fuel, then watch out. There will be no limit.

Formal notification of the desperateness of the fight was given last week when a senator and two congressmen from Pennsylvania called on President Roosevelt and asked him to back a tax of one cent a gallon on fuel oil in order to make it easier for coal to get a bigger and more profitable market. The President says he did not commit himself. But the fact that he did not say he was against such government price control can probably be taken as a safe indication that the idea is not foreign to the New Deal theories of government.

The story of the battle of the coal industry against fuel oil is reviewed in another story in this issue. It is not a long story, as the fight has only been on in earnest for a few years but its danger today lies in the fact that Congress gave the coal industry the Guffey Coal law last year to regulate marketing practices and prices in the coal industry which means wages for the miners.

Further, Senator Guffey is the outstanding Democratic boss of Pennsylvania at the moment and is understood to be supporting the investigation now being conducted into oil marketing by the Pennsylvania legislative committee. This committee has been casting longing eyes at gasoline price control and service station licensing.

The gist of the whole fight is that the coal industry must be put on a profitable basis, whatever that basis may finally turn out to be as to capital return on how much investment and for what rate of mining efficiency. The federal government is now committed to that.

Backing the coal industry in this fight are various groups who also are deeply interested in the price government fixes for coal. First, there is John L. Lewis' coal miners' unions. Their wage scale depends largely on the price for coal and Lewis has been active in support of government regulation of the price for coal. Then come the manufacturers of coal mining equipment whose business obviously would be determined somewhat by the profitableness of the coal industry. Then there are those directly active in coal—from mine operators to retail dealers—and the many coal mining communities. Together, these groups make up a formidable army supporting the coal control plan.

The coal industry has turned on oil and natural gas as its natural competitors. Coal men say that the prices for oil and gas must be raised to the consumer so consumers will quit using these and change to coal. The fundamental ground they give is "conservation" of these natural resources. However, they overlook that "conservation" also means efficient and valuable use, and certainly present use of these two fuels—gas and oil—fulfill both of these requirements. In view of the tremendous speed of development in the chemical industries, it becomes a mighty fine question as to how long a natural resource should be saved for a future that undoubtedly will nave all kinds of synthetic fuels and means of heating.

The country has had plenty of experience with how cock-eyed things get when government goes to monkeying with price, as in the case of agriculture for instance.

Now it is urged that government tax natural gas to give coal a greater market. A tax in and of itself means a higher price for gas. A smaller market also means a further increase in price because the cost of gas depends largely on the volume of its movement and unit sale. Further, the resultant higher price undoubtedly will shut off more uses of gas, meaning a still higher price in order to get a profitable gas business. So where will it all end?

The proposed tax on fuel oil will also distort the market picture and undoubtedly make more expensive a number of manufacturing uses—other than for steam raising—that the coal people had not thought of. But the great harm will come from the fact that probably a cent a gallon tax on the oil will not open up new markets for the coal people because these consumers want the ease of handling and the cleanliness that coal has not yet secured and they will probably pay quite a premium for the cleaner fuel. As the coal industry has set out to get back this domestic market regardless the oil industry can confidently expect the coal people to demand whatever tax is necessary to get that market for them, and that may be five cents or more a gallon before consumers rebel.

What of the effect of this taxing of one industry heavily so that another industry may prosper? If it should appear to work for the coal industry then what of other industries? If one labor union can get more money by raising the price of a commodity they are interested in then others will follow. In fact are not the coal miners following the strong railroad unions who have been parties to higher and higher freight rates in order to get more pay, until the freight rates are so high now oil is but a small user of the rails.

The pity of this attack of the coal industry on oil and natural gas is that the coal crowd have not seen what they themselves could do toward bettering their product, improving and cheapening its means of distribution and improving the facilities in which it is used. It is only in the last few years that certain interests—and they are other than coal mine owners,—have materially improved the mechanical facilities for burning coal, particularly in homes. Undoubtedly this development has just started considering the wonderful ingenuity of American engineers.

Compared to what the electrical industry has done in devising household equipment the coal people have not even made a start, even though the electrical industry is not more than 40 years old as an industry starting at scratch. Look at what has been done to develop the facilities for using natural gas and oil, and yet the oil industry has left

Ellick Botts Chews a Cud on Confab Of Business BB Shots at Washington

To the Editor:

We have been much interested out here in reading about the grading and sizing process through which business men are being put in Washington, like operating one of those shakers to separate sand and gravel for the cement mixers.

The big dornicks appeared at the White House first and the latest bunch, averaging in size, so the promoters of the affair thought, about like BB shot, put on a particularly noisy meeting which seemed to bewilder Sec. Roper and friends.

I guess the thing that astonished the Washington stage managers most was the looks of these small business men. They were prepared for an undernourished, anemic bunch of stragglers, resembling mostly the survivors of a shipwreck. You see, none of the Burrowcrats have ever actually seen any business men and they have mainly formed their impressions by listening to Chas. Michelson's stooges perform on the radio, or to the Great Crooner himself.

I have heard in a roundabout way that Sec. Roper and helpers were all ready to succor this band of business minnows and that the photographers were ready to show the actual business of taking the pilgrims down to the store and fitting them out with some boughten clothes to take the place of the homespun garb in which they appeared. The Salvation Army had been asked to stand by with some holiday baskets of food which were to be presented to the delegates at the station as they started home, with the newsreel boys getting all details.

Well, you have read how it turned out. The stage managers were so astonished to see their objects of charity come riding up in taxis and wearing the kind of clothes recommended by Esquire that they clear forgot to start the meeting. The result was that the delegates who had reduced their thoughts about the government to writing began demanding the floor and the whole thing wound up in a souffle of noise.

I looked at the pictures of the meeting as they appeared in the newspapers of this area. I had heard of several of the delegates who went up by invitation to represent the oil industry and to me they are away up in the stratosphere with their selection of small business men. One of the oil delegates delayed his ocean voyage to attend this meeting with Sec. Roper and I have been told that he wasn't going steerage or working his way on a cattle boat. I would guess that if you peek in the garages of the rest you would find that they are not used merely for storing the lawn mower.

No, if they want to see some small businessmen, they have got to drop several bench marks on the economic mountain. Let them come around my neighborhood and I will really get them some little fellows and I will promise that if they round up the kind I know best, they will have more noise than the last bunch made, for I have observed that the smaller they are the more uproar they can make.

Take Joe Botts, my cousin, who runs the Racket Store in our town. He's really little, businesswise, although he is about the size of a Notre Dame tackle and has a voice that carries clear to Strikeax township. Joe would make a splendid delegate to a convention of little businessmen, except that he would have to close the store while he went for he is president, sales personnel and bookkeeper. If he were invited, he would tell them all about it and there would be no need of amplifiers. He is accustomed to discussing current topics with the postmaster in the next block without leaving his premises and he has plenty of views on any subject that comes up.

Joe has worried along in this store since statehood, selling his calico and trading sugar for eggs and sorghum molasses and somehow making a go of it in spite of drouths and chinch bugs, but he says they have about got him licked and he would love an opportunity to tell Sec. Roper or even the Big One himself all about life's problems.

He has grown accustomed to explaining once a year why he doesn't have any taxable income but they came at him from a new direction a few days ago and wanted to know why he hadn't done anything about his social security tax and Joe says if you can tell him how to segregate one per cent of a crate of eggs or a firkin of butter as an employe and another one per cent as employer and put that to his credit, he will be much obliged. More than half his business is done by swapping and if Economic Planning has provided a spot for the thousands who run little stores like Joe's, it hasn't been revealed from Mount Sinai.

Then there was a man around from the government on a recent date asking Joe how come about undistributed profits and while it didn't cost anything, still it is a bother to have to haul out the books and explain everything to a different bureau every few days.

So, all in all, Joe is primed to tell them all off if he gets a bid to attend a Washington conference when they get down to the size of him and he says he would just as soon start in making his oration on the White House steps. Taxes are just a few of the things that worry him and he long ago gave up writing his Congressman about anything more involved than getting bulletins from the Agricultural Department.

So, I thought I ought to warn you that if you hear of a one-man conference breaking loose up there, that will be Cousin Joe who has grown tired of waiting for an invitation.

Ellick Botts,
Consulting Pumper.

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the domestic oil burner practically to look out for itself. Coal, in comparison, has done practically nothing.

It would seem only fair if the coal industry were to be told to try using its brains in developing and perfecting instruments for the use of its product before it starts saddling the doubtful policy, to say the least, of government price fixing on this country and the still more objectionable policy of pushing down one industry by law in order that another may get more profits.

When one looks at all other industries that have been using good American brains and some of their own dollars and have developed heretofore unthought-of markets from their ingenuity and hard work, one cannot give much sympathy to the coal industry. It is most suggestive of the town bully, now that the Lewis miners' union and the political machine of a great coal producing state have stepped up to fight its battles.

Read the Record, Mr. Cummings

Before the Attorney General does any more talking about the recent Madison oil case, it would be well if he himself read the record. To give Mr. Cummings an "out" we assume that he has been taking some one else's statement as to what the case is all about and what happened before the grand jury, in the grand jury and what occurred in court.

He should read the record himself. W.C.P.

Majors Are Invited To Jobber Meeting

CLEVELAND, Feb. 8.—Citing a NATIONAL PETROLEUM NEWS editorial urging a better relationship between the major and independent branches of the oil industry, R. M. Stith, president of the Indiana Independent Petroleum Assn., has extended an invitation to all the major oil companies, asking them, from their chief executives down into the ranks, to attend its spring convention March 2-4, in Indianapolis.

"The officers and directors of the association would like particularly to foster the ideals as set out by Editor Platt," wrote Stith in his letter of invitation, "and we are issuing this invitation to you in the hopes it may be possible for you to extend it down to division managers, salesmen, equipment managers and others of your company."

Stith offered the use of conference rooms for oil companies should they desire to hold special meetings of their own at the time of the convention.

Byles To Speak

WICHITA FALLS — Axtell J. Byles, president of the American Petroleum Institute, will be the principal speaker at the annual dinner of the North Texas Oil & Gas Association, Feb. 26, in Wichita Falls.

Columnist Replies to Cummings on Madison

CLEVELAND, Feb. 8. — Although the jury returned its verdict more than two weeks ago in the Madison oil case, convicting 16 corporations and 30 individuals of a conspiracy to fix tank car gasoline prices, readers of NATIONAL PETROLEUM NEWS continue to send in editorials and comment on the verdict clipped from their local newspapers.

In his column in the New York TIMES of Feb. 4, Arthur Krock comments for the third or fourth time on the Madison verdict.

"But the circumstances of this case bear repeating," Krock said, "particularly since previous discussions in this space have been disputed by government representatives as to facts and viewpoint. On viewpoint there can be no proof one way or another, this being the realm of opinion. So some who have studied the facts will continue —as does the oversigned—to believe that to have instituted criminal instead of civil suits was a shocking abuse of power and breach of faith; and those who instituted them will hold otherwise.

"On the facts, however, evidence can be presented. The statement in this space which has been singled out for dispute was that the Madison jury, 'composed of small merchants and farmers, was not permitted to take into consideration' the Ickes-to Arnott and Fahy-to-Arnott letters. The criticism is made that, since the government itself put the first in evidence, the jury was permitted to take it 'into consideration.'

"Space does not allow a full resume of the facts herein. But it can be noted that the government resisted introduction of the Ickes-Arnott letter as defense evidence for about two months on the ground that it authorized only steps under the NRA Code (which was never put in evidence) to deal with *retail* oil price wars. And, once the Ickes-Arnott letter was admitted, it was swept out of consideration by the charge of Judge Stone, along with everything else going to show that the government sponsored the acts complained of during the life of the NRA Code and stimulated voluntary action along code lines after the Supreme Court demolished the codes."

After citing the court's instructions that, if the jury found that the defendants combined in the manner and for the purpose described, it should not give any weight to the fact some of these illegal activities were considered in code meetings or that Arnott was called "chief stabilizer", Krock went on to say:

"That left the jury free to decide only whether the defendants had succeeded in raising prices, as the government had asked them to do, and, if they had — which was not disputed — to find them criminally guilty. The background of official sponsorship during and after the NRA period was swept away as mitigation by that instruction.

"The court also told the jury: 'It has been suggested that one of the purposes of the code was to raise the price of gasoline. Whether or not such was an objective * * * the defendants would not be justified in combining with others to raise the price of gasoline, assuming that they had the power to do so, unless their activities in this regard were specifically authorized by the code or approved by the President * * * or the Secretary of the Interior under the NIRA.'

"But the government succeeded in keeping from evidence seven of the eight articles in that very code, including Rule 4 which prohibited selling below cost. The only way to eliminate prices below cost was, of course, to raise them, and that is what the government asked the oil men to do under NRA. Further it was admitted that their activities were no different afterward. Yet, with a choice between civil and criminal suits, the same government instituted criminal proceedings."

* * *

They Stand Convicted

Dallas NEWS, Jan. 25

"Conviction of a large number of oil companies and of individual corporation officials for violation of the Federal antitrust laws is a spectacular addition to the history of 'trust-busting' that has made many political reputations. Since the dawn of antitrust legislation, price fixing followed a curious path, however, and in at least one respect, the proceedings at Madison, Wisconsin, impress the observer as radically unfair.

"Much of the evidence which the convicted defendants sought to introduce as to the extent of their operations under the Roosevelt-ordered and congressionally established NRA was excluded on objection by the Government's counsel. How much of the alleged price-fixing was totally outside of NRA regulation may have been a provable point. But in the interests of simple fairness, the Federal Government as the prosecuting agency should have itself sought to clear up the entire relationship between NRA and the defendants. The Government counsel's bitter fight to exclude this evidence justifies the surmise that the chief end of the prosecution was conviction.

"It becomes a simple statement of fact that whatever may have been done under the NRA cannot possibly have constituted guilt and its extent can have been readily established. If the present conviction is based on operation outside of NRA, it is justified by the statute and the verdict still would have been obtained if the Attorney General's Department had entered the courtroom with a frank explanation of the full facts.

"The decision, even if sustained on appeal, will not end price fixing in the oil industry for under State supervision today restriction of production under the guise of conservation is practiced for the sole purpose of maintaining the price structure at a level calculated to return profit. This is a sensible policy. Had the pact plan been followed during the period that involved the Madison defendants in their present troubles, the oil companies would have obtained both conservation and market stability without difficulty, the producer would have marketed his wares at a fixed rate and the consumer would have had to pay a fixed price. Ours is a queer world, seldom an altogether disinterested one."

* * *

The Oil Verdict

New York HERALD-TRIBUNE, Jan. 24

"The sensational conviction of a large portion of the American oil industry on criminal charges under the Sherman anti-trust act is being hailed by the legal janissaries of the New Deal as something comparable to the great Standard Oil dissolution suit decided in 1911. But the lay mind, judging by the light of history rather than by the niceties of the law, may guess that the closer comparison in the end will be to the earlier and only less famous criminal case in which a $29,000,000 fine was assessed against Standard by Judge Kenesaw Mountain Landis—but never collected. It is doubtful whether a jury of Wisconsin farmers and small business men, however good and true will prove any more successful than Judge Landis in solving the appalling intricacies of the anti-trust problem as it has now been worse confounded by the erratic course of the New Deal.

The conviction is a first fruit of that mood of repentance which overtook the New Dealers in the spring of 1936, when the N. R. A. had been put out of its misery by the Supreme Court and the "monopoly" issue was looming as a possible source of votes in the Presidential campaign. With the customary ardor of the repentant, the Administration took up not the usual and more practicable weapon of an injunction suit, but the sharper sword of criminal prosecution. Its inherent absurdity was soon to become apparent. It necessitated, in the first place, converting Madison, Wis., into the temporary oil capital of the nation, since it required many of the industry's principal executives to sit there daily in the dock. It then appeared from the testimony that the defendants were being charged as criminals for doing what the Administration, in the N. R. A. and oil code legislation, had but recently implored them to do as patriots, and what, moreover, Secretary Ickes had apparently encouraged them, in the interests of conservation and price stability, to go on doing even after N. R. A. had been voided.

"Though the N. R. A. decision may have reconverted such activities into technical crimes, criminal prosecution was still a profound incongruity under the circumstances, and was rendered no less so by the New Deal's continued enthusiasm for price stabilization and the elimination of "chiseling," by such things as the Miller-Tydings and Robinson-Patman acts, or by the President's own announcement, only two or three weeks ago and in the midst of the Ickes-Jackson "monopoly" furor, that he was still playing with the vision of government presiding over business combination to prevent "abuses." Throughout the history of the anti-trust laws, criminal prosecution has always proved a weak or inapplicable weapon to cut through the complications of right and policy involved, and progress has in the main been by way of the injunctive approach, which left the courts more free to chart some rational course through the tangle. The Wisconsin jurors may now be able

Is Interstate Oil Compact Now Illegal?

to shut their eyes to the anomalies of the situation and vote a stern "guilty"; but it is difficult to believe that the verdict will stand through all the higher courts to become a final answer to the problem of monopoly.

"And if it does not, just what will the prosecution have contributed toward finding that answer? Nothing at all. In 1936 the New Deal wrote not merely an anti-monopoly plank into its platform, but a far more sweeping promise to attack "monopolistic" tendencies and break up the "concentration of economic power." Yet from 1936 to the present moment it has never said how it proposed to do so. It has begun several rather sensational cases, but under laws which it has loudly declared to be futile. "Obviously," the Attorney General declares in his latest annual report, "the statute in its present form is not adequate for dealing with the many ramifications of the problem"; "the anti-trust laws," Mr. Jackson more brightly echoes, "have become theological tracts on corporate morality." But what is the proper and adequate policy, and what sort of laws are necessary to implement it? The only answer is a request that Congress investigate and find out.

"We do not know what the end of the present case may be. We do know that it brilliantly illustrates the almost grotesque tangle to which the anti-trust and monopoly problem has been reduced, and the crying need for clarifying Administration policy on a dozen interrelated questions—monopoly, stabilization, price policy, "unfair" competition, industrial co-operation, basing points, identical bidding and so on— if the Administration is even to begin to approach an issue which it pretends to be seriously attacking."

* * *

What of Oil Compacts?

THE DAILY OKLAHOMAN, Jan. 24

"Conviction of 16 oil companies and 30 individual citizens by a federal jury in Wisconsin calls to mind the remark of Governor Marland that the government cannot put a state in jail. Of course, the companies charged with fixing the price of gasoline cannot be put in jail, but their officials can be. And while the government cannot jail the states which have entered into a compact to regulate and limit the production of petroleum it could jail the individual officials who represent the states.

"Of course, the government may hold that there is a vast difference between the fixing of gasoline prices and the regulation of petroleum prices by limiting the output of the oil fields. Even though the government has convicted 30 citizens on a charge of fixing gasoline prices it may have no desire and no right under the law to prosecute those who would alter the market price of petroleum by entering into a compact to limit the production of the widely scattered fields. Notwithstanding the Wisconsin verdict the compact of the oil producing states may be entirely within the law.

"But it will be a sad day for Oklahoma if the government shall hold that the compact of the states is violative of federal law. In that event the lid will be lifted from production everywhere and ruinous prices will ensue. A drastic reduction in the sum of the gross production tax paid into the Oklahoma treasury will still further embarrass a state that is suffering already from the effect of inadequate revenues. Both the oil industry and the state will suffer sadly if the compact of the oil bearing states is outlawed. Let us hope that the formation of these compacts is not held to be an indictable offense.

"It is a peculiar thing that these 16 companies have been convicted for doing a thing that all businesses were asked to do or even required to do by the NRA. Of course, that ill starred law has long since been consigned to the morgue of lifeless statutes, but the underlying principle of the NRA was the very principle employed by the companies found guilty in Madison. What is commanded by the government one year is punished with fines and possible imprisonment the next year. The situation is peculiar indeed. If universal combinations and universal price fixing were necessary to save the country in 1933, just why should limited price fixing be considered inimical to the country's welfare in 1935?

"Of course, all good citizens should obey the law and respect the processes of the courts and all good citizens should accept the decision of the federal court in Madison. But the same reasoning will apply to the Illinois case wherein a federal judge assessed heavy damages against a number of laborers who were charged with having injured a mining company by the enforcement of a prolonged strike. If one of these federal decisions should be respected, both should be respected. But we suspect that some of the people who proclaim the result in Wisconsin as a glorious victory for the people will proclaim the Illinois result as a rank injustice. Yet both decisions are alike in that they represent the voice of the law of the land.

* * *

Straw in the Wind

Baltimore SUN, Jan. 24

"The conviction by a Federal jury at Madison, Wis., of sixteen oil companies on charges of price fixing contrary to the terms of the anti-trust laws strongly suggests that if Mr. Roosevelt and his law officers are in earnest as trust busters they will not lack for considerable public support. The jury found the companies guilty despite their plea that the agreements were sanctioned, at any rate tacitly, by code authorities under NRA. This Madison jury, at any rate, is willing to give competition a chance as against the form of co-operation formerly, and apparently to some extent still, favored by Mr. Roosevelt.

However, if the Government intends to follow through with its anti-monopoly campaign, it will be necessary for Mr. Roosevelt to decide that his Administration will proceed in that direction and not be diverted from time to time by excursions into co-operation and agreements to reduce production and other expedients so attractive to the President in the past. The Government may have some success in breaking up price-fixing agreements, but its efforts in that direction will hardly be taken seriously if it simultaneously sponsors agreements to distribute automobile production among various supposedly competing manufacturers. When the Administration itself knows what it wants, it will be easier for the rest of us to make up our minds upon the merits of isolated suits against monopolies.

* * *

The Madison Verdict

WASHINGTON REVIEW, Jan. 31

(Chamber of Commerce of U. S.)

"The verdict in the oil case at Madison emphasizes the need for a clarification of the anti-trust laws and for a uniform enforcement policy.

"What effect the verdict will have on those who have been maintaining that the anti-trust laws are inadequate remains to be seen.

"Obviously, the Madison verdict creates new confusion and uncertainty in the minds of business men who are contemplating co-operative relations with an agency of the government.

"The defendants in this case were trying to further a policy endorsed and actively supported by one branch of the government to conserve an important natural resource. Under the NRA this policy was embodied in a code which had the status of a law of the land. Subsequently, the same policy was pursued with the knowledge, if not with the express approval, of the same government agency.

"Admittedly, no division of the administrative part of the government has authority to waive the provisions of a substantive law, such as the anti-trust laws. Nevertheless, the failure of one department of the government charged with enforcement of the laws to give due consideration to the activities of another department is, to put it mildly, inconsistent with ordinary conceptions of fair dealing.

"Changing the rules in the middle of the game will doubtless make business men more cautious in their efforts to comply with government planning proposals."

* * *

After the Oil Case Convictions, What?

Business Week, Jan. 29

Now that 16 companies and 30 of their executives have been convicted in a federal court of violating the anti-trust laws by fixing gasoline prices, what next in anti-trust policy? The defendants pleaded that they were carrying out the purposes of NRA, and that Sec. Ickes, as administrator of the oil code, wrote a letter asking them to do what they were later indicted for doing. But the judge instructed the jury, "The objectives of the NRA code do not justify illegal action, even though government officials knew of and acquiesced in defendants' actions." Naturally the oil men who went along with the Ickes program feel confused. And business as a whole suffers from a similar confusion. Cooperation and price stabilization at one moment, prosecution the next; a Jackson with his thunderings, a Richberg with his cooings. We hope Mr. Roosevelt finally makes up his mind.

Newspaper Views On Madison Case 'Amaze' Cummings

N. P. N. News Bureau

WASHINGTON, Feb. 7.—Expressing "amazement" that the Justice Department should have received so much adverse criticism from the newspapers for its conduct of the Madison oil cases, Attorney General Homer S. Cummings has announced that the department hopes to bring the "second indictment" against major oil companies and individuals in the Midwest to trial sometime this fall.

Cummings said the second case, which charges 23 companies and 36 individuals with conspiracy to fix uniform jobber margins, will be tried in the Madison court, where the indictments were brought.

It was indicated at the department that anti-trust division officials feel they have an even stronger case in the second indictment than the one involving buying programs just tried, and Cummings said that the chief reason the other case was tried first was that some of the defendants had agreed not to fight removal to the Madison jurisdiction in that case.

The Attorney General's expression of amazement at adverse newspaper comment on the Madison trial was precipitated when a correspondent remarked upon the editorials and columns of commentators, and asked if Cummings cared to comment.

"I would be glad to," Cummings said, "it is amazing, literally amazing that there should have been so much adverse newspaper comment on the fact that the government won such a striking victory in an anti-trust case. It is also amazing that competent writers should have so misunderstood what actually went on."

Then the cabinet officer traced the origin of the case back to "widespread complaints, from all parts of the country, which the government neither could, would nor desired to ignore."

"Willful Resistance"

Cummings said he authorized the grand jury proceedings after "our investigations met with willful resistance on the part of the oil concerns to give us information.

"After the case came to trial," he went on, "we were confronted by about 80 lawyers—some of the most eminent members of the American bar had been brought in" to defend the accused. Cummings then referred again to the difficulties the department has in trying an anti-trust case, in which "our little group of attorneys" has to face such an imposing array of legal talent.

"None can say," Cummings said, "that these defendants were not well defended. Every argument human ingenuity could devise was brought to the aid of their case."

Then, after they were convicted after trial by a "jury of twelve men and a competent judge," he went on, "the newspapers have come out with articles saying "that these men should not have been convicted —they are not willing to accept the verdict of the jury."

What struck him most forceably about this, Cummings said, is that "we are urged to prosecute, and when we do we are criticized for prosecuting and convicting."

All the issues raised by the newspaper columnists and editorial writers, he said, were raised in the trial, and presented to the jury, which decided the case in the government's favor.

Taking up the newspaper columns which said the Justice Department had brought the companies to trial for doing what the government had told them to do under NIRA, Cummings said:

"That is what the defense says. The trouble about it is that it wasn't so, and, further, the jury didn't think it was so. You can always take one side of a case and get a false impression of what happened

"I reiterate with all the emphasis at my command," he said, "that the trial was a fair one. These things quite frequently come up. After you have been at it as many years as I have, you will get used to a certain amount of misrepresentation."

The attorney general was asked again why the case was taken to Madison, and repeated his previously given answer—that dockets were crowded at the other two courts where trial was considered—Detroit and Chicago. He also said that Detroit was avoided because "some of the most violent attacks on the defendants had originated in Michigan."

Asked about the so-called "economic penalties" which had been suggested as punishment for the convicted defendants—barring them from use of the Panama Canal, seizure of pipelines and other property, etc.—Cummings only smiled and indicated the department did not plan to go that far.

The suggestion was also made by a newspaperman that one of the defendants was an alien, and Cummings was asked if he would take steps toward deportation. A broad smile was the only response.

Senate Group Will Probe Oil Exports

N. P. N. News Bureau

WASHINGTON, Feb. 7. — Senator Elbert D. Thomas, Utah, chairman of the Senate Military Affairs subcommittee studying the export of materials "essential to national defense," has assured Paul E. Hadlick, secretary of National Oil Marketers Assn., that his subcommittee will take up the study of petroleum exports as a part of its survey.

In a letter to Sen. Thomas, Hadlick thanked him for his reply to an earlier letter from the NOMA secretary saying the committee will take up the study, and calls to his attention figures published in NATIONAL PETROLEUM NEWS (N.P.N. Feb. 2, p. 7) showing that 1937 exports of petroleum products were 43 per cent above those in 1936.

"They are even more astounding than I anticipated," Hadlick's letter says, and quotes the figures.

"Even more astounding," the letter goes on, "is the fact that prices quoted for petroleum products for domestic consumption are higher than for export. There is enclosed herewith a sheet from one of the price reporting papers (*Platt's Oilgram*) showing that in the Gulf coast bulk market both gasoline and kerosine are being sold for export below that for domestic consumption. It is my understanding that crude oil for export is also sold at less than the going domestic market.

"It does seem strange," the Hadlick letter continues, "that we should engage in a 'dumping' policy for natural resources in the face of the 'fake' oil conservation policies that have been promulgated to enrich the major oil companies. To cap the climax, please recall that Congress has further impeded true conservation by enacting a duty on the importation of petroleum products."

Hadlick said the 'fake' oil conservation policies of the country "fortified by acts of congress, have done nothing whatsoever to conserve our natural resources of oil. The policies, supported by the Connally Act, the interstate compact, and the monthly forecasts of the Bureau of Mines, simply attempt to hold the production of crude oil to market demand so that the major oil companies can get a higher price for their crude," he said.

Closing his letter, the NOMA official said:

"If congress desires to really do something to preserve our natural resources of oil, it should prohibit or embargo exports, take off the duty on imports so that we can take that which we may from the world markets, and repeal the above-mentioned legislation. This will leave the states with their present power to prevent waste in the production of oil. And this prevention of waste should be limited to the prevention of physical waste without reference to a lot of confusing theories of waste that limit production to market demand.

"I am glad your committee is going into this matter, and I sincerely trust that you will bring before your committee all the facts that are available."

Madison Case Up Again, March 24

N. P. N. News Bureau

CHICAGO, Feb. 7. — The oil conspiracy case in federal court in Madison, Wis., in which 30 individual and 16 corporate defendants were found guilty by a jury Jan. 22, enters the next stage next month when Judge Patrick T. Stone will hear arguments on motions March 24.

Motions are to set aside the verdicts, to arrest judgment and for a new trial.

After the jury returned the verdicts the court granted defense counsel the right to file these motions. Motions for the Pure Oil Co. and the three Pure Oil individual defendants were filed Jan. 22. Motions for other defendants were filed Jan. 25.

TPD Fuel Oil Bids

N. P. N. News Bureau

WASHINGTON, Feb. 7. — Treasury Department Procurement Division has announced the following dates for opening of bids to supply federal government fuel oil requirements during the April-June quarter of 1938:

Regions 1 and 2, Feb. 17; Regions 3 and 4, Feb. 18; Regions 5 and 6, Feb. 21.

Maxwell New Petrol Manager

LOS ANGELES, Feb. 5. — H. D. Maxwell, president of the H. D. Maxwell Oil Co., Tacoma, Wash. has been made general manager in charge of sales for Petrol Corp. with headquarters at the new offices of this integrated independent California oil company in Los Angeles.

Maxwell will retain his affiliation with the Washington company, which will be in charge of R. R. Hall, vice president.

More Bills for 'Gas' Grading And Price Posting Introduced

N. P. N. News Bureau

NEW YORK, Feb. 7.—Only a handful of state legislatures are now meeting, as compared with 1937 when sessions were held in nearly all of the states, but bills to regulate the marketing of petroleum products are cropping up, according to reports received here.

Besides the Virginia gasoline-grading bill, on which hearings will be held Feb. 9 at Richmond, there have been a flock of bills providing specifications for motor fuel introduced in Massachusetts, Mississippi and Georgia.

North Carolina pointed the way last year, enacting a law—now in operation — providing that every gasoline pump in the state must bear a state insignia specifying the grade dispensed therefrom.

One of the Massachusetts bills (hearing set for Feb. 10) provides for three grades of gasoline, with different octane specifications for bulk plants and service stations.

For premium gasoline with tetraethyl lead the octane-number requirement in the Massachusetts bill is 75 for service stations and 76 for bulk plants; for premium with benzol the octane-number is 74 for both stations and bulk plants. For regular grade it is 69 at stations and 70 at bulk plants; and for "motor gasoline," 62 and 63, respectively.

The bill also proposes specifications on distillation range, corrosion, sulfur, vapor pressure and gum-content for each grade.

Wholesalers would be required to file the name of brands marketed; dealers would have to label pumps with the grade sold.

Another Massachusetts bill, besides providing for grading and price posting, outlaws cash rebates, prizes, premiums, games and lotteries. It also provides that prices may not be changed for 24 hours after a price change has been posted.

The Georgia bill, providing for posting of octane specifications of gasoline sold, has been given an unfavorable committee report.

Premium Colored Red

An omnibus bill introduced in the Mississippi legislature, in addition to establishing gasoline specifications for each grade and providing for price posting, specifies regulations for the coloring of gasoline, containers and tanks. It was proposed that premium grade be colored red with an octane minimum of 76; regular, any color other than red, and minimum 68 octane; and third grade, no octane requirement and not to be colored.

New York has another price-posting bill, requiring that price signs be not larger than 6 by 8 inches. Dealers could sell at any price, if posted and if not below cost, under terms of this bill. A permit, costing $2, would be required for each gasoline pump.

Another New York bill provides for codes of fair competition for service industries, including filling stations.

Mississippi has a bill to regulate the installation of equipment for "bottled gas." Rhode Island again has a bill to make the gasoline business a public utility.

The Virginia price-posting bill, sponsored by Independent jobbers of the Old Dominion, met with opposition from consumer groups at a hearing Feb. 2.

Pennsylvania Oil Probe Is Stymied

By Telegraph

HARRISBURG, Pa., Feb. 7.—The Dauphne county court today continued its injunction restraining the commission authorized by the 1937 Pennsylvania legislature to investigate the oil industry in this state from proceeding with further hearings.

The injunction will remain in force until the local court hands down a formal opinion in the proceedings. There was no indication of when the court expects to make its decision.

President Judge William M. Hargest denied a petition filed by George W. Scudder, Philadelphia, to intervene as a tax payer in the suit.

The court on January 20, granted an injunction to the Petrol Corp., Philadelphia, restraining the commission from examining the books of the company. Hearings of the commission have been postponed because of the injunction.

Wm. J. Litke, attorney for the commission, asked the court to dismiss the injunction on the grounds that the court has no jurisdiction.

The committee was termed "a roving, snooping commission of five private individuals," by Walter Biddle Saul, Philadelphia, attorney for the Petrol company. One of the members of the commission is a competitor of the Petrol company, Saul also informed the court.

The court was told that the injunction already has cost the commission approximately $1500. The daily payroll of the commission is $66 and the employes are unable to proceed with their work until the injunction is lifted, it was said.

Saul urged the court to allow Scudder to intervene as a taxpayer to prevent spending the $50,000 appropriated by the legislature for the oil investigation.

New York Oil Probers To Discuss Bills

N. P. N. News Bureau

NEW YORK, Feb. 7. — Members of the New York joint legislative committee, which has been investigating the oil industry in this state for more than a year, will meet this week in Albany, it was reported here.

Proposals for state regulation of oil marketing, based on the committee's investigation, will be discussed in an executive session, it was understood.

TULSA, Feb. 5. — Arthur W. Duston, 51 years old, geologist and president of Commonwealth Royalties Co. died Feb. 2 in a Tulsa hospital. He had been associated with several companies in his 25 years of practice and had done some of the work which led to the discovery of the Seminole field.

Crude Stocks Decrease

WASHINGTON, Feb. 8. — Crude stocks on January 29, were 304,286,000 barrels, a decrease of 138,000 barrels from total reported on January 22, according to the Bureau of Mines. Stocks on January 30, nearest comparable date last year, were 285,384,000 barrels.

Stocks by grades showing changes during the week Jan. 22-29, follow:

Grade	Jan. 22	Jan. 29	Change
	(Thousands of Barrels)		
Penna grade..	4,254	4,240	— 14
Other Appal...	859	869	+ 10
Lima-N. E. Ind.-Mich. ..	1,078	1,372	+294
Ill.-S. W. Ind...	9,477	9,477	....
N. La.-Ark....	8,011	8,067	+ 56
W. Tex. and S. E. N. Mex.	31,951	31,212	—739
East Texas ..	24,700	25,355	+655
Other M.-Cont.	127,178	126,118	—1,060
Gulf Coast....	25,245	25,512	+267
Rocky Mt.....	23,803	23,801	— 2
California	25,202	25,390	+188
Foreign	3,466	3,623	+157
Tot. reported..	285,224	285,036	—188
*Unreported ..	19,200	19,250	+ 50
Total stocks..	304,424	304,286	—138

*Estimate.

Farmers Oppose Bill To Require Price Postings

RICHMOND, Va., Feb. 7.—A subcommittee report on the price-posting bill, sponsored in the state legislature here by the Virginia Petroleum Jobbers Assn., is expected shortly.

Following hearings last week before the Senate general laws committee, the bill was referred to a subcommittee for a report.

Bill was opposed by the Virginia Farm Bureau Federation and the state horticultural society who contended that it would force Virginia farmers, now buying in 50-gallon drums, to pay the same price as the motorist who drives up and has five gallons put in his automobile tank.

Opposition was also voiced by the Virginia Highway Users Conference who said that truckers as far as possible would cease buying gasoline in Virginia and that the proposed law would mean a revenue loss of $500,000 to the state.

The bill was supported by M. B. Whiting, Whiting Oil Co., Clifton Forge; Wm. Earle White, Petersburg, Delta Oil Co., and Tucker Watkins, South Boston; U. S. Oil Co. Whiting is former president of the National Oil Marketers Assn.

Spokesmen for the jobbers' association said that proposed law would obviate price wars, under-the-canopy discounting, commercial consumer discounts, and other forms of "chiseling" including special prices to "friends" of the station.

G. A. Steele Dies

TULSA — G. A. Steele, president and general manager of the Sinclair-Pierce Oil Co., Mexico, died in Mexico City, Jan. 28, after an operation for appendicitis. He was 54 years old and had lived in Mexico since he was 19 years old when he started with the Waters-Pierce Co. as a clerk. He had risen to the position of general manager when the Sinclair interests acquired the Pierce companies.

Refiners Meet At Shreveport

N. P. N. News Bureau

TULSA, Feb. 7. — The regular monthly technical meeting for plant men, sponsored by the Louisiana-Arkansas-East Texas division of the Western Petroleum Refiners Assn., will be held at Shreveport, La., Friday afternoon, Feb. 11. This session will be devoted to the answering of a score or more of questions that have been dropped into the "question box" in the past three or four months.

Regard Consumer Demand A Factor In Stabilization

N. P. N. News Bureau

NEW YORK, Feb. 7. — In view of the present economic status of the oil industry resulting from its 1937 operations, more than usual interest will be shown by oil men generally in the coming meeting of the Petroleum Division of the American Institute of Mining & Metallurgical Engineers in New York Feb. 16 and 17. The meetings of the petroleum division are part of the general annual meeting of the A. I. M. E. Feb. 14-17.

A session on Economics for several years has been a feature of the petroleum division's meetings. Here the leading economists of the oil industry, and some from without, exchange their ideas as to the course the industry should follow to achieve greater stabilization in its operations, stabilization in general and for specific industries being a goal of all economists.

The views of the oil economists are their own; they come to their meetings not as representatives of oil associations or even of individual companies, but rather as members of a profession. Their ideas as expressed are generally projected into the future and they give some constructive thoughts on possible future operating policies of the oil industry.

Thus, at the coming session on Economics at the A. I. M. E. meeting, Joseph E. Pogue, now a vice president of the Chase National Bank, New York, well known as a petroleum economist, will give an address on "An Equilibrium Theory of Petroleum". Alexander Sachs, an economist well known in general business circles, who was chief of the division of economic research and planning of the NRA, will talk on "Administrative Problems in the Control of Economic Domains".

Economic Uses

A paper will be presented prepared by John Gill and E. T. Knight, both of the Atlantic Refining Co., on, "What Are the Economic Uses of Petroleum?" Norman D. Fitzgerald, of the Chase National Bank, will discuss, "The Market for Oil Shares in 1937."

In view of the recent both formal and informal discussions of some of the oil economists who will take part in this meeting, it is likely that there will be presented there some thoughts on extending further the idea of conservation through balancing crude supply and demand, which is now achieved through the proration program of the state regulatory agencies in the oil producing states in the southwest, and taking into account consumer demand as an important factor in a balancing of operations.

Pogue expressed something along this line in an article recently in the Jan 8th issue of the New York Sun, its "Voice of Business" issue. Discussing the outlook for oil, he stated: "On the whole, however, the oil industry is in a favored position in respect to demand and the possession of means for maintaining equilibrium and it may be hoped that during the course of the current cycle added flexibility may be developed in the instrumentality of proration to which the industry is committed."

Discussing 1937 operations in the oil industry, he stated, in the course of the article, that the advance early in that year in the price of crude and the corresponding strengthening in the markets for refined products acted as a stimulus to supply, which rose to meet mounting demand.

Supply Outran Demand

"Indeed, the stimulus proved to be more than ample," he stated, "for supply tended to outdistance demand to some extent resulting in moderate additions to storage." After citing increases in production and stocks he continued, "These relationships indicate that the industry tended to expand its operations too rapidly, although the excess did not appear significant as long as the trend of demand was sharply upward. It was contended that larger inventories were desirable in view of expanded requirements and the risks of localized shutdowns arising from labor disagreements."

Pogue described the oil business as entering the period of economic reversal that came in the latter part of 1937 at full speed and with great momentum. "Some deceleration in the pace of the oil business with the approach of cold weather was due in all events," he stated, "but the change in the economic background called for a quicker and more vigorous application of the brakes.

"Fortunately for such eventualities, the oil industry is equipped with a powerful four-wheel braking system, involving in addition to price the mechanism of proration which, as an adjunct of conservation, is concerned with maintaining a balance between supply and demand.

"Between Aug. 15 and Dec. 15, both price and state-directed curtailment of supply operated to bring about some measure of conformance between the oil industry and the declining trend on the part of the general economy."

In looking forward into 1938, Pogue wrote in the Sun article, the scene revolves about the prospective levels of general business, the effectiveness with which the mechanism of proration operates and the degree with which the gasoline situation can be held in balance by temperate refinery operations.

It is likely that the question of the extent to which refinery operations of the oil industry will conform to the need for closer balancing of supply and demand in the future will be given considerable discussion at the coming A. I. M. E. meeting. Another feature of the session of its Petroleum Division will be the usual Symposium on Oil Production, the morning of the 16th.

Oklahoma Facing Emergency Cut In Crude Allowable

(*Continued from page 9*)

nounced restrictions of similar nature or quietly reduced buying without announcement, during the late summer and fall. In January, pipeline proration was more general than at any time since the state of Kansas began handling the job of ratable taking. Even though the commission reduced the state's allowable 10,000 barrels daily for February, purchasers are finding themselves unable to take all the oil that may legally be produced, so the restrictions imposed by purchasers are about the same as in January.

Some purchasers were not definite about their coming purchases at the end of the week, as their figures on January business had not been compiled. It is always a few days after the close of a month before the pipeline runs and deliveries are known definitely.

Sinclair Prairie Oil Marketing Co. is continuing its 90 per cent purchase basis for February, both in Oklahoma and Kansas. This applies to stripper areas as well as to prorated fields.

This method of curtailing production has been little used outside Kansas and Oklahoma and in the latter state thus far by one company. In Texas the Atlantic Refining Co. found it necessary last fall to restrict its takings in Ward county for several weeks and there was a period of pipeline proration in two Louisiana fields.

True Proration Destroyed

The trouble with this method, aside from the hardship to the producer, is that in a competitive field true proration—equal rate of takings—may be destroyed. One purchaser may be buying 90 per cent of the allowable, another 80 per cent and one producer may thus be getting more of his allowable production run than is his offsetting neighbor.

The demand of a number of purchasers clearly is for still further reduction of allowables. This, of course, imposes difficulties on the producer who has gone along under the repeated whittlings at the allowable production per well until there are actually fields today with drilling yet to be done where the pay-out period is 3½ to 4 years. That is, the producer will be that long recovering his investment in the well.

In Texas, where the Sunday shutdown is in effect, a real reduction in production has been achieved. The Texas Railroad Commission figured it to be around 180,000 barrels daily after the first of the six shutdown days and the American Petroleum Institute called it 168,000 barrels.

Results in Texas

Allowable production in Texas on Jan. 15 was 1,405,240 barrels but it is now somewhere in the neighborhood of 1,450,000 barrels, with some special increases granted and the completion of new wells whose allowable production is added as they come in and take their place in the list of producers. Now, ordinary figuring would be that cessation of work for one day, or the optional reduction of one-seventh from the production, would result in lopping off about 225,000 barrels daily.

It doesn't work out that way, for there are numerous instances where allowable production is far above what the field will actually produce. In District 7B, for instance, an old area which includes the Ranger district, Brown county, and several other counties of thoroughly settled production, the allowable has consistently been way above real production, with little or no proration actually in effect.

The railroad commission's monthly report for November, the latest available, shows this district to have been underproduced 14.82 per cent. Its total allowable production for the month was 1,508,659 barrels and actual production was 1,285,127 barrels. So, in deducting one-seventh, the actual pro-

duction would be the figure considered, which is far different than applying the deduction to the allowable.

The state as a whole was 2.41 per cent underproduced in November and while that will not account for all of the discrepancy between the estimated reduction via the Sunday shutdown and what the reduction would be through taking off an exact one-seventh of the total allowable for the state, the too-high allowables in some areas will take care of part of the said discrepancy.

Many Exceptions Made

The Sunday shutdown program is not being carried out strictly on that basis, for many exceptions are granted in every district. In general, no operator is shutting in a well that would be injured by such interruption of its producing schedule. The commission's order made ample allowance for such cases, also for the operation of wells whose casinghead gas is needed to supply gasoline plants and to heat homes. In East Texas there were nearly 12,000 wells operating Jan. 22, the first Sunday the order was applicable. That is about half the wells in the field.

But the one-seventh reduction is being made throughout the field, nevertheless. Purchasers of oil attend to that. When they apply for permits, called tenders, to move crude oil they must state in detail as support for the application where the oil is to be taken, by leases, amounts and days. Their application, of course, must agree exactly with the allowable as set by the state. The purchaser will not take more oil from a lease than is listed in the application. Hence, the one-seventh is being cut off by the buyers and there is no advantage to the producer in holding any excess on his lease in storage.

The "policing" of the order, in the final stages, is done by the purchasers who instruct the pipeline gaugers just how much oil to run. This tender system was taken lightly by a few purchasers several years ago until a couple of them paid heavy fines for not paying close attention to the rules.

Mid-Continent Plants Reduce Their Output Of Motor Fuels

N. P. N. News Bureau
By ALLEN S. JAMES

TULSA, Feb. 7.—Despite the fact the statistical position of motor fuel stocks in the Mid-Continent is far better than in other refining districts in the country, indications here are that the general tendency is to further pinchdown crude runs to stills.

Particularly is this true with the smaller integrated companies and those which have no marketing division at all to consider in planning plant operations.

Some of these refiners, according to reports, curtailed crude runs in January as much as 20 per cent as compared with December operations. A few have shut down completely, among them being the McMurrey Refining Co. at Tyler, Texas, the Barnsdall Refining Corp.'s plant at Wichita, Kans., the Cushing Refining & Gasoline Co.'s plant at Blackwell, Okla., the Chase Refining Co.'s plant at Chase, Kans., and the Pure Oil Co.'s plant at Muskogee, Okla.

When the McMurrey officials shut down their plant last week they paid off all employes and recommended they seek employment elsewhere. This was taken to indicate that the plant was to be kept idle for an indefinite period.

Extend Clean-Out Period

Other refiners who have not shut down entirely have pinched down crude runs in recent weeks in other ways. January being the normal "clean out" month, some refiners are reported to have stretched the clean-out period from a normal four or five days to as much as a week or 10 days.

A comparison of crude runs back in September, 1937, with those for January, as reported by the American Petroleum Institute, indicates that in the Mid-Continent area runs have been cut 15.5 per cent during the latter month. Daily average crude runs during September were 503,800 barrels in the Oklahoma-Kansas-Missouri, the Inland Texas and the North Louisiana-Arkansas refining districts.

This daily average was arrived at by converting the daily average runs reported by weeks into total crude runs for the Calendar month and then arriving at a daily average for the month.

By the same method it was found that crude runs for the first 29 days of January averaged 425,500 barrels daily. It must be kept in mind, however, that the variation in percentage of plants reporting each week prevents the figures from being entirely accurate, but the variation is not considered large enough to throw the figures too far out of line for practical comparisons.

A comparison of the daily average crude runs for each of the districts for the periods mentioned is shown in the accompanying Table No. 1.

Motor fuel stocks in the Mid-Continent on Jan. 29, meanwhile, were only 3 per cent above total stocks for the district as reported by the American Petroleum Institute on Jan. 30, 1937. The Oklahoma-Kansas-Missouri group of refiners in this district actually had stocks 6 per cent under those of Jan. 30, 1937, but for the Inland Texas group stocks were 31.6 per cent higher, and for the North Louisiana-Arkansas group stocks were 40.8 per cent higher. The comparisons are shown in Table No. 2.

Much the same conditions as brought about a curtailment of the manufacture of motor fuel in the Mid-Continent district applies also as regards lubricating oils. Several plants have either cut down their manufacture of neutrals and bright stocks or have shut down entirely for periods ranging up to 30 days and longer. The dates on which these plants will start up are said to depend entirely on market conditions.

The plants which are continuing to operate in several cases are those of companies which have large distribution through their outlets, some of these companies even buying on the market to supply their own needs. A few other plants operate on non-paraffinic crudes, refine finished motor and other lubricants and do not directly affect the bright stocks and neutral oils situation in the Mid-Continent.

In the accompanying Table No. 3 stocks, production and shipments of neutrals and bright stocks in the Mid-Continent are shown from last June, through November, a decrease in production of neutrals is to be noted during September, but a greater increase during October and November, which is in line with the seasonal trend, the greater use of neutrals for winter motor oils. Stocks dropped during September and October, but increased in November, with a corresponding drop in shipments.

TABLE NO. 1

Comparison of Daily Average Crude Runs in Mid-Continent For September, 1937, with Runs in January 1938, as Reported by the American Petroleum Institute

(Figures in Thousands of Barrels)

Period	Okla. Kan. Mo.	Inland Texas	N. La. Ark.	Total
Sept. 1937	317,300	141,900	44,600	503,800
Jan. 1 to 29	253,800	133,200	38,500	425,500
Decrease	63,500	8,700	6,100	72,300
% change	—20.0	—6.1	—13.7	—15.5

TABLE NO. 2

Comparison of Motor Fuel Stocks in Mid-Continent Area Jan. 30, 1937, with Those Jan. 29, 1938, as Reported by American Petroleum Institute

(Figures in Thousands of Barrels)

Period	Okla. Kan. Mo.	Inland Texas	N. La. Ark.	Total
Jan. 30, 1937	7,647	1,956	360	9,963
Jan. 29, 1938	7,183	2,574	507	10,264
Change	—464	+618	+147	+301
% change	—6.1	+31.6	+40.8	+3.0

TABLE NO. 3

Neutral and Bright Stocks Production, Shipments and Stocks in the Mid-Continent, June to November, 1937

(Figures in Barrels)

	Neutrals			Bright Stocks		
Month	Production	Stocks	Shipments	Production	Stocks	Shipments
June	170,536	202,603	196,253	180,595	277,118	194,555
July	171,127	209,006	164,724	155,101	268,723	163,496
Aug.	177,102	218,610	167,498	139,325	264,157	143,891
Sept.	151,892	202,362	168,140	162,954	250,566	176,545
Oct.	177,887	203,569	176,680	163,688	276,424	137,830
Nov.	180,033	223,518	160,084	161,159	304,371	133,212

California Tidelands Tangle Is Tied Up In Another Snarl

BULLETIN

By Telegraph

LOS ANGELES, Feb. 7.— Superior Court today dissolved preliminary restraining order granted the Long Beach taxpayer which had prevented the city from developing a four-acre section of Harbor Tidelands and held up other drilling permits.

* * *

N. P. N. News Bureau

LOS ANGELES, Feb. 5.— Gusher completions in the Long Beach harbor section of the Wilmington field, boosted production from the structure to around 90,000 barrels a day the past week, to place it at the top of producing fields in the state and to put a new emphasis on legal, political and legislative moves already outlined to test ownership of tidelands, which are the source of considerable production in both the Long Beach and Los Angeles harbor districts.

The question of title to tideland mineral rights—gas and oil in this case—was thrown into California courts February 4th by state officials, who claim some 30 wells are trespassing on public lands.

This situation became even more complicated with the report that federal interest had been revived in the tideland matter and that some action would be taken to claim all tidelands, submerged lands, and resources found on these lands, as a part of public domain and property of the Government.

Aimed at stopping production of oil from tidelands in the Wilmington area by private interests, pending settlement of the argument between state, and Los Angeles and Long Beach officials on the question of ownership, four suits were filed in a Los Angeles superior court yesterday by State Attorney-General U. S. Webb.

This action was based on the state contention that when tidelands were deeded to the two municipalities for harbor development, back in 1911, the deed was for surface rights only and did not relinquish rights of the people of California to underlying minerals, oil and gas.

Furthermore, it is declared that the two cities illegaliy granted oil drilling permits on tidelands and that, as a consequence, upward of $500,000 worth of oil and gas has been taken from one group of wells.

The suits were directed against, in addition to the two municipalities, the Union Pacific Railroad Co., Ford Motor Co., Interstate Investment Corp., General Petroleum Corp., Westgate-Greenland Oil Co. and a group of "John Doe" companies, described as interested in the drilling operations.

Ford and Union Pacific were named because some of the drilling permits were on land leased or bought by these companies for plant expansion and development in the harbor area. Much of the land was formerly tidal lands but was filled in as a part of reclamation work in the area.

State Seeks Injunction

In each suit the state asks for an injunction to restrain the defendants from taking oil and gas from the lands in question and it was also asked that the defendants be required to give an accounting of all petroleum produced to date. Reasonable damages were also asked.

Another spoke to the wheel was added during the week when the California Supreme Court—at the request of Long Beach city officials— agreed to hear and decide whether the state or the city owns oil deposits under Long Beach tidelands.

On January 26th the Long Beach Harbor Commissioners discontinued issuance of drilling permits in the area when a taxpayer obtained a temporary restraining order to prevent oil development on a parcel of tideland property.

Long Beach officials claim that during the regular process of this litigation through the courts, private interests would completely drain city-owned oil. At the request of the city, the supreme court issued a writ of mandate directing the harbor commissioners to show cause March 3 why drilling permits should not be issued.

As a background for these more recent developments in California's tideland problem, but promising to eclipse all other parts of the show before the month is out, is the coming special session of the state legislature in Sacramento.

Legislature Eyes Tidelands

Governor Merriam has already announced that an extra session will be called—the latter part of February or early in March—to discuss among other things, ways and means for the state to increase its take from tidelands along the California coast which it claims for its own.

At a state assembly interim revenue and taxation committee hearing in Los Angeles, it was disclosed that the legislators would be asked to modify a statute passed in 1929, which prohibited actual drilling in the tidelands, and to create an independent commission to handle leasing and development of state tidelands.

An attorney for the state department of finance, testified in behalf of legislation permitting the state to lease its lands for oil development, either by tideland drilling or by slant-hole drilling from the mainland, with proper provisions for condemnation proceedings.

He also suggested that some legislation be enacted which would permit the state and its political sub-divisions to enter into agreements as to division of royalty in cases where a prolonged lawsuit would be detrimental to state interests. It was thought this legislation should also include provision for compromise between state and private owners with respect to determination of boundary lines.

Production Control Talked

The proposal to call a special session of California legislators comes at a time when there is much off-the-record-talk about the possibility that discussion will include a control measure to regulate and curtail production of crude oil in the state.

There is every evidence that output of oil on the west coast will exceed 750,000 barrels a day before March 1st, in spite of a voluntary curtailment figure of 693,700 barrels set by the Central Committee of California Oil Producers for February. Actually the voluntary quota is about 650,000 barrels, with about 44,000 barrels of the allowable for distribution to new wells completed in the month.

Observers tend toward the belief that a control bill is in the offing and that, because of the larger stake the state now has or will have in the oil production pot, the curtailment enactment would provide for state, rather than industry control.

If a measure of this nature is to be considered at the coming special session, political observers point out that an announcement to that effect would have to be contained in the official notice of meeting, which is expected shortly.

Output Highest In 8 Years

Preliminary figures indicate California crude oil production in January was the highest for any month since February, 1930. Production during the first month approximated 716,860 barrels and exceeded December output by about 8000 barrels a day.

On January, 31, 1938, the state produced 720,054 barrels. Of this, Wilmington produced 86,754 barrels, or 12 per cent of the total. Kettleman Hills North Dome, which had been the leader in output, produced 77,980 barrels on that day and was followed by Long Beach with 57,938, Midway-Maricopa with 54,781, and Santa Fe Springs with 41,137 barrels.

At Wilmington, production was divided, 25,232 barrels from the Long Beach side and 61,522 barrels from the Wilmington side. During the past week five wells were put on production in the Long Beach section of the field, several of which promised to make potentials in excess of 10,000 barrels a day.

In all there are nearly 100 wells either drilling or waiting the clearing away of argument and legal entanglements before starting operations in the Long Beach harbor area. As an evidence of the bidding for good locations in this comparatively new play, one company offered a cash bonus of $27,000 and a 50 per cent royalty on oil recovered from a four acre tract owned by the city of Long Beach. Drilling under this contract has been held up pending the legal proceedings.

Bill Claiming Tidelands For U. S. Is Advanced

N. P. N. News Bureau

WASHINGTON, Feb. 7. — Hearings will begin Feb. 23 before the House Judiciary subcommittee on the Nye resolution (S. J. Res. 208) which would declare all oil-bearing tidelands to be under jurisdiction of the federal government.

Senator Gerald P. Nye (N. D.) introduced this resolution, which passed the Senate last August, as a substitute for his tidelands bill introduced early in the last session. The resolution has the effect of making the procedure of taking over the tidelands by the federal government clearer, according to the North Dakota senator.

It would empower the attorney general "through speedy and appropriate proceedings" to assert the federal title to such lands lying between low-water mark and the three-mile limit off the coasts of the United States, and to eject such trespassers as now may be on these submerged lands.

East Texas Shipments Down

TULSA, Feb. 5. — Shipments of refined products from the East Texas field in January totalled 3405 cars, a decline of 498 cars from the December total, according to Railroad Commission records.

Hauls Gasoline To West Coast, Fuel Oil Back

N. P. N. News Bureau

LOS ANGELES, Feb. 5. — More Texas gasoline for the automobiles of Pacific Coast motorists appeared certain in view of a verified report that the Mallory tanker Hoxbar had left a Gulf port the past week with 80,000 barrels of gasoline for delivery to California and Washington points by the middle of February.

Although company officials declined to comment, it was understood this tanker had been chartered by Petrol Corp., independent integrated California company, and would be used for intercoastal movement of fuel oil from the west coast to Atlantic points, starting about February 26.

Reports from the mid-continent said the Hoxbar was loaded dirty at American Petroleum Co.'s terminal with 60 octane, 400 e.p. gasoline. The price was understood to be 5.0 cents a gallon, loaded, which conforms with local reports that the gasoline would be laid down at west coast points for 10.25 cents, including 4 cents tax, or a net of 6.25 cents.

This price compares with a tank car quotation of 7.5 to 8.0 cents for a comparable or slightly lower grade at Los Angeles Basin independent refineries.

Despite the lack of comment by Petrol officials, this company has been labeled as consignee for the eastern gasoline. The company will put a new bulk oil terminal, near Point Sal, 20 miles south of Port San Luis on the California coast, in operation about February 15.

Built at a cost of $325,000, this terminal, which is equipped to load tankers 3250 feet offshore through two 12-inch submarine lines, will provide the company with an outlet for recently developed production in the Gato Ridge field. Although heavy, this oil makes good fuel and is expected to find a ready market in offshore trade.

The company is also reported to have in mind the chartering of three or four tankers to engage in intercoastal trade. Although it is not known that this movement will call for picking up a load of Texas gasoline on every return trip, bargain prices for motor fuel on the Gulf plus the saving by a pay-haul each way, might make such a venture profitable.

That is, it would be profitable as long as West Coast gasoline markets were able to absorb the foreign gasoline without breaking. In the face of rising crude production in California and a softening of third-grade gasoline prices in some quarters, security of existing motor fuel prices is believed placed in jeopardy by this westward movement of Texas gasoline.

A. A. Bates Dies

TULSA — A. A. Bates, office manager for Amsco Refining Co., Corpus Christi, died on a train near Guthrie, Okla., while en route to his former home in Madison, Wis., Feb. 1.

DAILY AVERAGE PRODUCTION IMPORTANT DISTRICTS
American Petroleum Inst. Figures

	Week Ended Feb. 5 Barrels	Week Ended Jan. 29 Barrels
Oklahoma City	114,000	134,000
Total Okla....	533,100	553,900
East Texas ...	424,000	423,250
Total Texas...	1,218,600	1,237,800
Rodessa	43,350	43,450
Total La.	258,000	254,650
California	729,700	725,200
E. of Rockies..	2,586,750	2,632,450
Total U. S.....	3,316,450	3,357,650
Crude imports.	66,290	76,000
Tot. new sup'ly	3,382,740	3,433,650

Motor Fuel Stocks Down 1,550,000 Barrels; Crude Runs Down

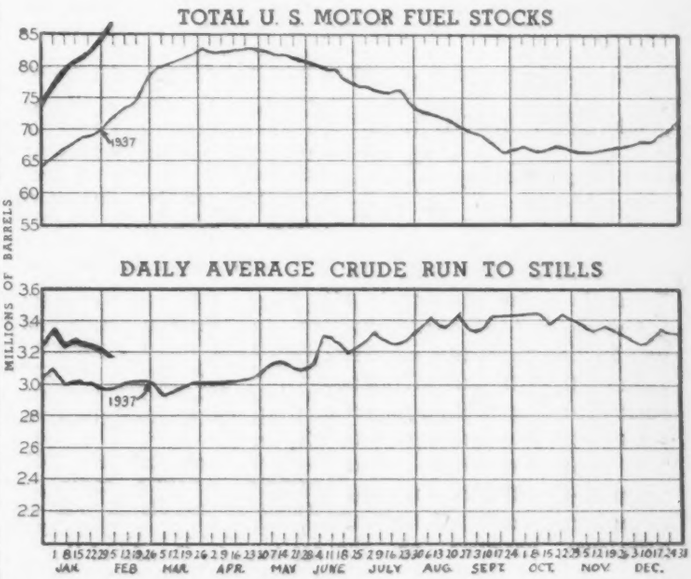
N. P. N. News Bureau

NEW YORK, Feb. 8. — Crude runs to refinery stills declined further the week ended Feb. 5, to 2,840,000 barrels daily average, indicating a drop of 16,000 barrels from the previous week, according to the American Petroleum Institute. Runs had declined 47,000 barrels the previous week. Motor fuel stocks on Feb. 5 totaled 81,504,000 barrels, an increase of 1,550,000 barrels over the previous week, and an increase of 8,575,000 barrels since the first of the year. The previous week these stocks had increased nearly 2,000,000 barrels. The largest increases were in the East Coast and Indiana-Illinois-Kentucky districts where they were up more than 500,000 barrels each. An increase of 197,000 barrels was reported in Oklahoma-Kansas-Missouri and one of 143,000 barrels in the Rocky Mountain area. The Texas Gulf district reported the only decrease, one of 114,000 barrels.

Gas and fuel oil stocks declined 174,000 barrels, with the East Coast indicating a decline of 470,000 barrels, and Texas Gulf, one of 306,000 barrels. Indiana-Illinois-Kentucky stocks declined 116,000 barrels, but offsetting these declines was an increase of 785,000 barrels.

A 76,000 barrel decline in crude runs to stills in California, was balanced by increases of 28,000 barrels in East Coast, 29,000 barrels in Indiana-Illinois-Kentucky, and smaller increases elsewhere. Declines of 23,000 barrels in Oklahoma-Kansas-Missouri, 28,000 barrels in Texas Gulf and 14,000 barrels in Louisiana Gulf plants, were reported.

Refinery operations dropped from 77.1 per cent to 76.7 per cent the past week.



CURRENT REFINERY OPERATIONS

Districts	Per Cent Capacity Reporting	Daily Average Crude to Stills (Barrels) Week Ended Feb. 5	Daily Average Crude to Stills (Barrels) Week Ended Jan. 29	Per Cent of Reporting Capacity Operated Week Ended Feb. 5	Per Cent of Reporting Capacity Operated Week Ended Jan. 29	Stocks Thousands of Barrels Total Finished and Unfinished Motor Fuel* Feb. 5	Stocks Thousands of Barrels Total Finished and Unfinished Motor Fuel* Jan. 29	Stocks Thousands of Barrels Gas & Fuel Oil Feb. 5	Stocks Thousands of Barrels Gas & Fuel Oil Jan. 29	Cracked Gasoline Production % Total Capacity Reporting	Cracked Gasoline Production Daily Av. Production (Barrels) Week Ended Feb. 5	Cracked Gasoline Production Daily Av. Production (Barrels) Week Ended Jan. 29
East Coast	100.0	517,000	489,000	77.3	73.1	20,550	20,029	10,976	11,446	100.0	91,000	98,000
Appalachian	88.4	96,000	112,000	74.4	86.8	3,340	3,334	1,227	1,216	94.6	28,000	26,000
Ind., Ill., Ky.	92.4	440,000	411,000	90.0	84.0	14,515	13,959	6,655	6,771	98.5	132,000	120,000
Okla., Kans., Mo.	84.7	240,000	263,000	62.7	68.7	7,380	7,183	3,483	3,557	90.3	62,000	68,000
Inland Texas	56.6	128,000	119,000	63.7	59.2	2,648	2,574	1,685	1,659	71.7	43,000	35,000
Texas Gulf	95.7	704,000	732,000	88.3	91.8	12,618	12,732	10,181	10,487	98.0	162,000	165,000
La. Gulf	96.6	122,000	136,000	72.6	81.0	2,606	2,526	3,210	3,281	100.0	25,000	28,000
No. La., Ark.	63.7	43,000	39,000	74.1	67.2	559	507	487	471	77.5	8,000	6,000
Rocky Mt.	69.7	56,000	45,000	90.3	72.6	2,067	1,924	711	691	85.4	14,000	9,000
California	90.9	494,000	570,000	66.2	68.4	15,221	15,186	77,214	76,439	98.0	62,000	66,000
Total Reporting	89.0	2,840,000	2,856,000	76.7	77.1	81,504	79,954	115,829	116,003	94.8	627,000	621,000
Estimated U. S. Total (Bur. of Mines Basis)		3,155,000	3,170,000			85,484	84,844	118,619	118,793		695,000	685,000

*Includes stocks at refineries, in bulk terminals, pipe lines and in transit.

Nebraska Oil Truckers Attack Law Against Sunday Operation

LINCOLN, Nebr., Feb. 7. — Oil truckers lost the first round in their fight against the new Nebraska truck law, prohibiting Sunday operation of tank trucks larger than 900-gallons capacity, but they are determinedly preparing for the next round.

The Lancaster county court Feb. 3 vacated a restraining order against enforcement of the truck law which had been obtained by Jacob Niederhaus, Lincoln, and other oil truckers. Hearing of the injunction suit on its merits will be held March 15. Meanwhile, the county court has declined to issue a temporary injunction.

Should the court deny a permanent injunction after the March 15 hearing, an immediate appeal will be taken, according to C. M. Sutherland and Sons, Lincoln, attorneys for the oil truckers, who say that they will take the case to the U. S. Supreme Court, if necessary.

The Nebraska truck law, besides providing for compulsory liability insurance, regulation of hours of service for drivers and annual permit fees for all transport tank trucks over 900-gallons capacity, prohibits the operation of such trucks on highways of the state on all Sundays, July 4th, and Labor Day between the hours of 6 A.M. and midnight.

Attorneys for the truckers contend that the law greatly increases operating expenses, besides depriving the truckers of 54 operating days a year. They contend that the state law is unconstitutional because, among other reasons, it attempts to regulate interstate commerce.

The petition points out that there are 123 Nebraska truckers operating in interstate commerce as common or contract carriers, and 65 private carriers so operating. In all, there are 215 oil truckers operating in Nebraska with some operating as many as eight transport trucks, it was said.

Most of the truckers haul from Kansas refineries direct to service stations and bulk plants in Nebraska.

Movement of Oil By Water Gains

N. P. N. News Bureau

WASHINGTON, Feb. 7.— Domestic water movements of petroleum and petroleum products in 1936 were 10.5 per cent greater than in the preceding year, according to final government figures just released here. This figure represents a comparison of adjusted totals of water-borne crude oil and all petroleum products on the coasts of the United States, the Great Lakes, rivers and canals.

The adjusted total tonnage in 1936 was 129,002,000 short tons as compared with 116,812,000 tons in 1935. These figures sum up totals published in the annual report of the chief of engineers, War Department. Expressed in barrels (multiply by seven), 903,014,000 barrels were moved by water in 1936 and 817,684,000 barrels in 1935.

Largest gains in water movements for 1936 were at Atlantic coast and Gulf coast ports with respective increases of 14.1 and 25.1 per cent. Atlantic coast ports had receipts and shipments approximating 706,020,000 barrels and Gulf ports handled approximately 532,340,000 barrels. There was negligible change on the Great Lakes, where the total was 48,870,000 barrels, and a drop of 13.6 per cent at Pacific coast ports to 259,200,000 barrels.

Mississippi Oil Traffic

Increase in petroleum traffic on the Mississippi river and its tributaries was 6.4 per cent in 1936 and the total is approximately 107,870,000 barrels of all oils. Other Gulf coast rivers showed an increase of 90 per cent with a total of 47,700,000 barrels. Atlantic coast river traffic of petroleum was down 5.6 per cent to a total of 63,144,000 barrels. Canals of the U. S. gained over 20 per cent to a total of 233,000,000 barrels of all oils.

Crude oil, fuel oil and gas oil, largest in volume of water movement, made the largest percentage gains in 1936—15.7 per cent for crude and 14.5 per cent for fuel oil and gas oil. Volume of crude oil shipments was approximately 295,000,000 barrels (6.7 times tonnage). Fuel oil and gas oil totalled approximately 251,000,000 barrels (6.7 times tonnage).

Gasoline, third largest in volume with 232,000,000 barrels moved by water in 1936, gained only 1.9 per cent over 1935. Only loss in volume was for lubricating oil, the drop totalling 20.3 per cent to bring the tonnage down to 1,515,936.

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Oklahoma Producer Dies

EL DORADO, Kans. — Chester Conklin Shelden, 57 years old, oil producer and former newspaper man, died recently at his home here. He was one-time managing editor of the Daily Oklahoman, Oklahoma City, and worked for about a year on the Cleveland (Ohio) PRESS. He went to El Dorado in 1910 and while editing a newspaper there became interested in oil and operated as an independent producer in Butler county until he became ill a year and a half ago.

I. T. I. O. Official Dies

OKLAHOMA CITY — Clyde DeVerse, district superintendent for Indian Territory Illuminating Oil Co. at the time the Oklahoma City field was discovered, died Feb. 1 of injuries sustained last October in an oil field fire. He was 50 years old.

He was in charge of the crew that drilled in the discovery well of the field on Dec. 4, 1928 and subsequently was superintendent over a considerable part of the I. T. I. O.'s big development campaign.

Research Should Start At the Filling Station

BY ARCH L. FOSTER, Technical Editor

One of the most important and far-reaching tendencies in the petroleum and automotive industries, a trend which has come about so gradually as to be practically unnoticed, is the greater control of refining processes and products from the sales end of the business. Not that sales departments are in control of manufacturing departments, in the narrow sense. The control which sales is coming to have over the refiner's operations is based on the best possible reason—the quality and properties of finished products which the consumer requires to make more efficient the operation of the equipment in which those products are used.

In fact, it is not too much to say now that the major operations in the refinery are "dictated" by the results of co-operative research carried out by the research departments which study the application of products—motor fuel, lubricants, and so on, to their specific uses.

By the intensive study of gasoline engines, the qualities which are most efficient in fuels for those engines have been determined to a much higher degree than the manufacturing department ever achieved alone. With the study of anti-knock test methods has come an understanding of the effect of various fuel properties on the performance of those fuels, which has essentially revolutionized the manufacture of fuels. Knowledge of what properties are needed in fuels to increase efficiency has forced the manufacturing departments in turn to work out ways and means of producing those properties.

Efficiencies of automotive engines have been stepped up remarkably the last ten years, specific fuel consumption has been reduced to little more than half what it was a decade ago. The basic information obtained when comparing performances of different engines on the road with fuels of differing properties has shown the engine designers more about what is wrong with their product than all the pure engineering that has ever been practiced. Not a co-operative road test program has been carried out but both fuel refiner and engine designer went away with data which caused them to change either design or refining methods.

From these tests has come the knowledge of what properties are lacking in engines and fuels. Many of the important design improvements in 1938 engines are the direct result of poor performance of the predecessors of those engines in co-operative road tests, where the faults of all engines tested were known to a large number of engineers who are leaders in their fields. Practically every refiner in the country started in to improve his own motor fuel as soon as road and laboratory tests, co-operative or individual, showed his product to be lacking seriously in essential properties in comparison with competitive fuels. As a result the "trick" fuel of today becomes the standard commercial product of tomorrow.

It is not too much to say that the study of fuel and engine testing fathers and directs the refiner's and the engine designer's work. These research programs do not tell the refiner how to make fuels with the desired properties; their results tell him what he must make to have a better product, and his manufacturing development organization hunts for and finds processes to achieve the results he wants.

The improvement in fuels and engines traceable to results of testing both products competitively shows returns to both industries to pay the costs of the research "an hundred fold."

Refining Technology

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Means for correction of anti-knock ratings of motor fuels on the road must be developed, to eliminate or reduce discrepancies between road and laboratory test results.

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Patent Literature

In Refining Technology

VIII. Straight Synthetic Lubricants

By J. H. BYERS

Part 1

Abstract

● Synthetic lubricants may be produced from a large number of raw materials, as disclosed in the 58 patents reviewed in this article, the eighth in the series by this authority, in which patent coverage of various branches of the refining technology field is being brought up to date. The first article in this series appeared in these pages, Dec. 2, 1936.

Synthesis of lubricants may be effected by polymerization, hydrogenation, etc., of waste or cheap petroleum by-products, from coal tar residues, even from carbon and hydrogen in the form of molecular hydrogen and carbon monoxide. Gaseous paraffinic and olefinic hydrocarbons are polymerized to yield oily products of very high molecular weight. Aluminum chloride, sulfuric acid, stannic chloride, phosphoric acid, and many other chemicals are used as catalysts; electrical discharges, ultra-violet light are used for the same purpose. One of the advantages of synthesis of lubricants is that properties and characteristics of products can be controlled over a wide range; desirable properties can be accentuated, undesirable ones can be minimized or eliminated, by synthetic methods properly controlled.

TODAY there are over two million U. S. patents. To search these documents is an impossible task without the aid of some kind of systematization. Reliance is placed on the official classification, but this system, fundamental and necessary though it be, is becoming increasingly difficult to maintain. Patents are growing in number and complexity, specifications are being augmented by multiplied species. Advances in chemistry and other sciences tend to render established classes obsolete.

The following example gives an idea of the type of material which is supposed to be harmonized with existing lines of classification: Hydrocarbon oils, naphthalene, brown coal tar oils, petrolatum, paraffin wax, products from the destructive hydrogenation of coal, benzene, gaseous olefines from cracking gases, and hydrogenated German oil, are used as initial materials. These are converted into intermediate products by cracking, dehydrogenation, or chlorination into olefines or chlorinated hydrocarbons. The intermediate products are polymerized or condensed using catalysts such as alumina, bauxite, zinc chloride, barium chloride, titanium oxide, phosphorus pentoxide, copper, aluminum chloride, boron fluoride, phosphorus oxychloride, activated aluminum, sodium or zinc dust, bleaching earths. Then, solvent extraction or fractionation may be used to separate various constituents. The latter can now be used per se as lubricants, or they may be added to mineral oils to lower the pour point.

From the viewpoint of those interested in the foregoing disclosure under what heading should it be classified? Hydrocarbons, condensation reactions, mineral oils, lubricants, distillation or catalysts? We would prefer that it be placed in lubricants, but on the other hand there are some who would find use for it elsewhere. An apparently logical procedure would be to put copies in each of the pertinent classes. But this leads to expansion of already overstuffed arts. Multiply two million patents by a factor of even two or three and you have created demands on shelf space, salaries of personnel, cost of printing, and other expenses that are anathema to a Federal department in which there is, believe it or not, government economy. Plainly, too, since time of searching is directly proportional to the number of patents searched, over-classification by which the same specification is repeatedly encountered, and irrelevant entries are thumbed over, is no advantage to the gentry who wear callouses on their elbows. The other horn of the dilemma is a casual sort of cross-indexing which compells the investigator to be a mind-reader to know where something is likely to be classified.

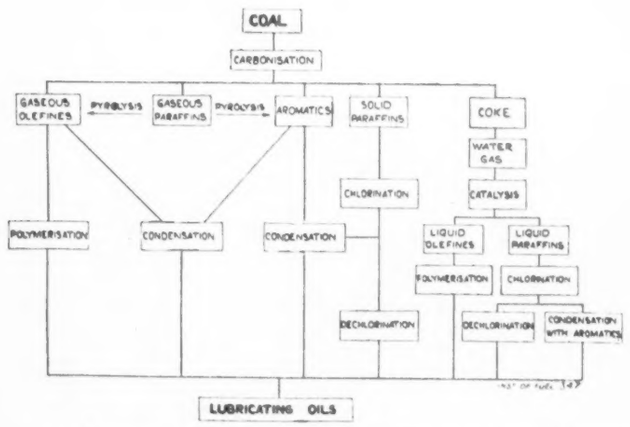

Fig. 1. Diagrammatic illustration of the conversion of coal into lubricating oil (from Hall, Wiggins and Nash, J. Inst. Fuel [British] Dec. 1935)

The current re-classification of patents is good as far as it goes, but it will never solve the problem. In chemical patents at least, abstracts, and digests, which distill the essentials out of the mixture of technology and law that go into patent disclosures are needed to render the material available, and keep it up to date.

The present series of digests, limited to the refining industry, are along this line. The idea is to boil down the

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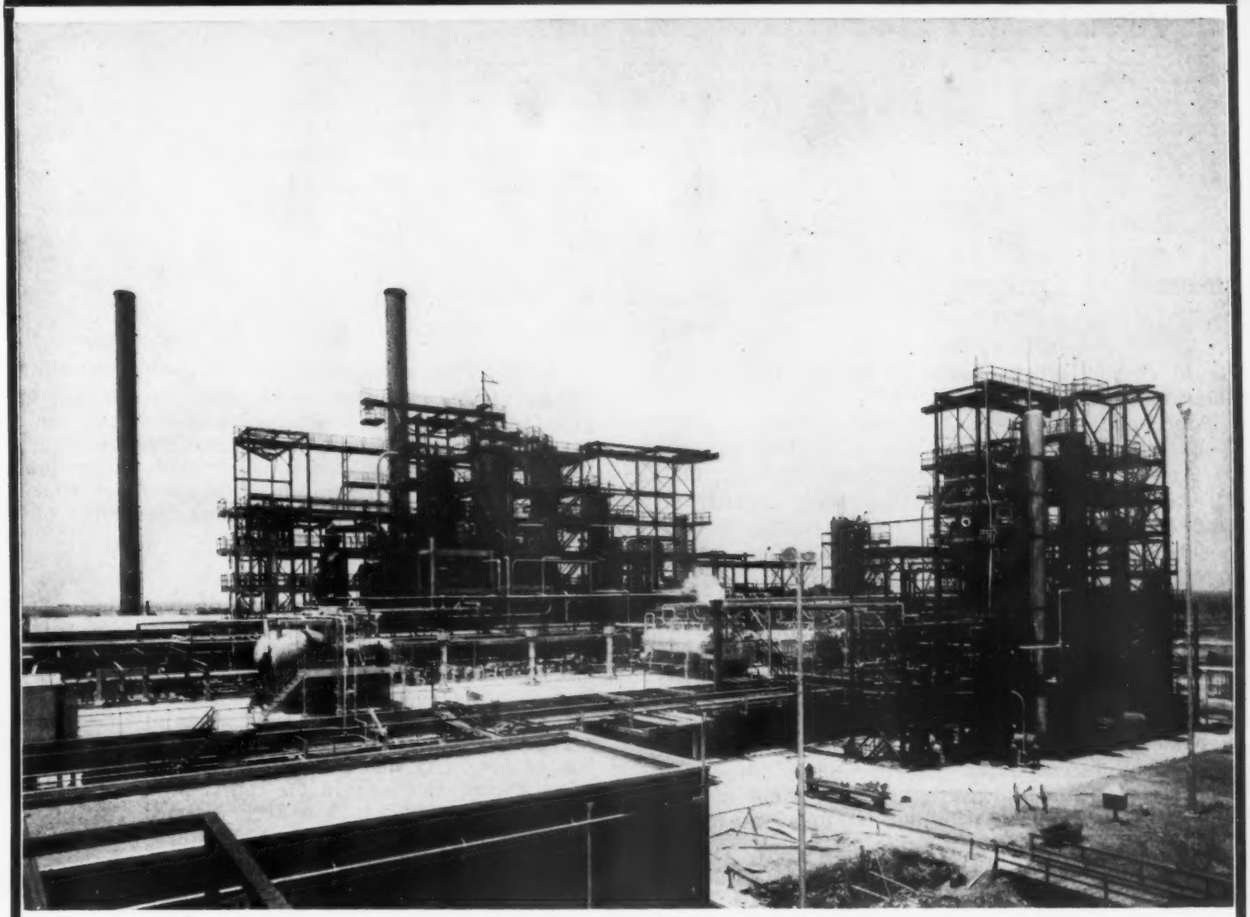

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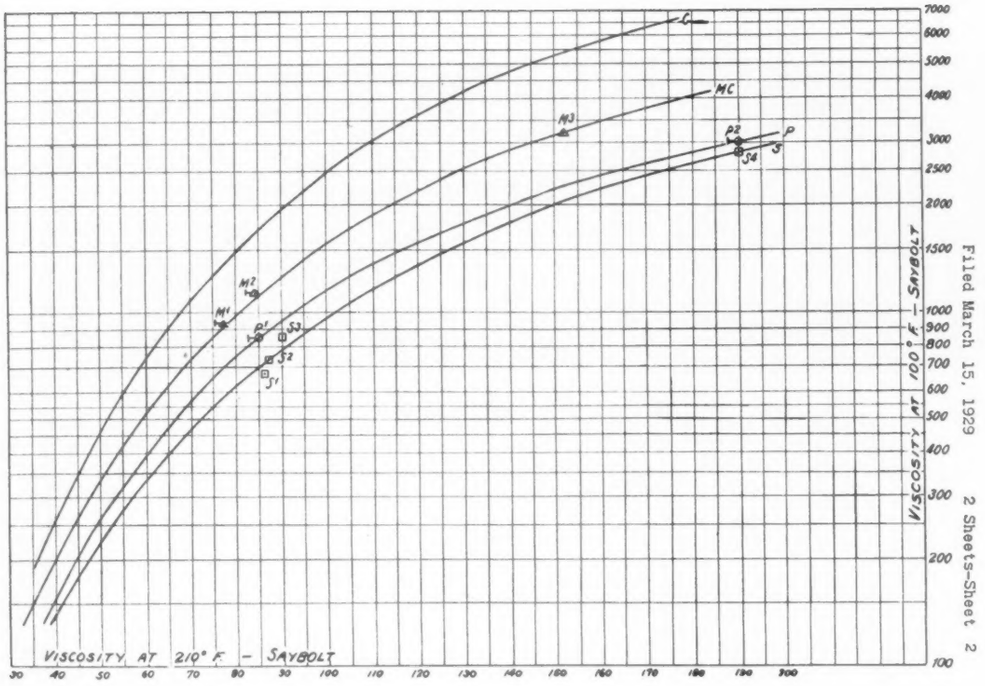

Fig. 2. Graph showing comparative viscosity-temperature curves of natural lubricating oils and synthetic oils (Fig. 2, Pat. No. 1,955,260, Sullivan and Voorhees)

patents in certain active classes of current interest. To date, digests are available as follows:

I. Pour Point Inhibitors, N.P.N. Dec. 2, 1936.

II. Extreme Pressure Lubricants, N.P.N. Dec. 16, 1936.

III. Anti-Oxidants for Lubricants, N.P.N. Feb. 10, 1937.

IV. Gum Inhibitors for Gasoline, N.P.N. March 17, 1937 and April 14, 1937.

V. Oiliness Agents, N.P.N. July 14, 1937.

VI. Synthetic Lubricants, N.P.N. Oct. 6, 1937.

The results of these presentations have been gratifying. Much interest has been shown by technologists, executives, inventors and attorneys. The writer wishes to thank those who have encouraged this work by their expressions of approval and interest.

Patented improvements are evolutionary steps. The recent innovations are the offspring of earlier ideas, and these in turn descend from more primitive inventions. Ideas beget ideas, and the average patent is not a startling departure from the norm, but an improvement on existing devices.

THE earliest attempts to improve natural lubricants were crude. Available substances were selected and tried. Graphite and soap have survived, and of course, animal and vegetable fats and oils, although the latter have declined in favor. In early days, additives such as rice, clay, marshmallow, filings, pumice, plant leaves, salt and pepper, were admixed with oils in various ways, for reasons best known to the inventors.

A change occurred on the introduction of petroleum. This discovery in fact, ushered in a new era in lubricants, one that has continued to the present. Petroleum products have almost entirely superseded the old animal and vegetable fats and oils. Although straight mineral oils are deficient in oiliness, their availability, low cost, durability and perhaps, above all, their controllability give them precedence.

However, it is not imaginable that the petroleum era is the final stage in lubricant evolution. A significant series of discoveries have been accumulating of late, which point toward the supersedence of natural oils by synthetic substances. It has long been known that polymerization and condensation will build high molecular weight substances from lower weight molecules and that if conditions were properly controlled, viscous oily liquids were obtainable using nothing but simple substances; for example, hydrogen and carbon monoxide can be built up by a series of reactions into synthetic lubricating oils.

At present, these synthetic lubricants depend, for the most part, upon petroleum as a source of raw materials. Waste products are converted into valuable lubricants. But if lubricating hydrocarbons can be built up, practically, from carbon, oxygen, and hydrogen there is no limit to raw materials, due to the common occurrence of these elements.

IT is the view of some investigators that synthetic lubricants are not imminent in countries where petroleum supplies are available. Undoubtedly, the adoption of these oils will be gradual. On the other hand, the activity that is now being shown in patents along this line, is not to be overlooked. Nor can the predictions of Dr. A. C. Fieldner of the Bureau of Mines, that nothing but new methods of obtaining and processing petroleum can stave off a petroleum shortage in 20 years, be brushed aside as fantasy. Then too, it has been claimed that really remarkable results can be obtained with synthetic oils, that they can be made to specifications with a flexibility of properties unparalleled by petroleum oils. Therefore, while it is true that synthetic oils in order to meet competition with petroleum oil must overcome a formidable handicap in the form of involved chemical procedures, high cost, and relatively unknown potentialities, nevertheless syn-

In a prior article (N.P.N. Oct. 6, 1937) we have suggested that synthetic oil additives are at present acting as an opening wedge. Other additives will doubtless be developed as time goes on, and some will be used in increasing amounts, culminating, it is not unreasonable to suppose, in completely synthetic lubricants. From the industrial chemist's angle, utilization of waste petroleum products, and elimination of expensive refining steps, are interesting possibilities.

While petroleum reserves are exceedingly limited, supplies of coal are abundant. Naturally coal is being considered as a raw material for synthetic oils. Coal is composed largely of carbon, with smaller amounts of hydrogen. Heated in enclosed ovens it yields volatile matter which deposits tar on cooling. Also, gaseous olefins and paraffins are obtained by thermal decomposition of coal, and these can be converted into lubricating oils (Fig. I). Coal tar oils yield lubricants of inferior quality, but their viscosity can be increased by condensation and polymerization (Klever, Lautenschlager & Gohring, Pat. No. 1,350,814). Or by reaction with acetylene in the

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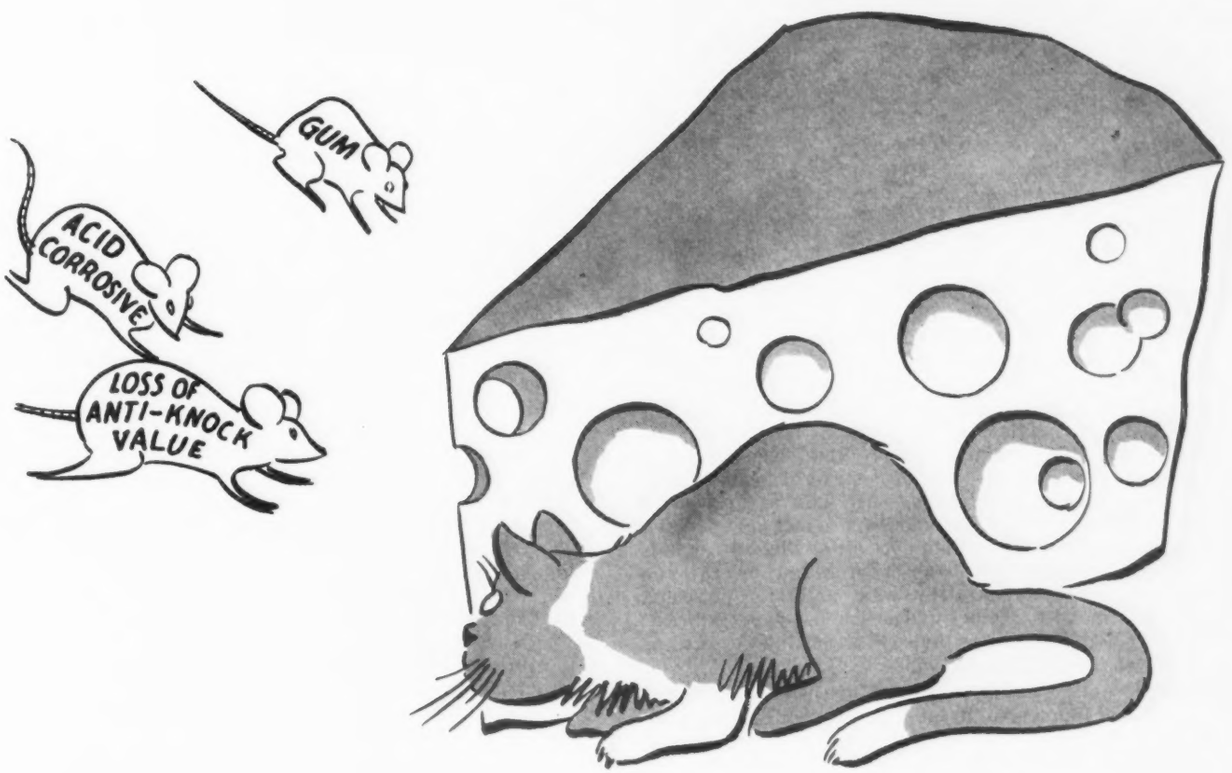

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GASOLINE ANTIOXIDANTS

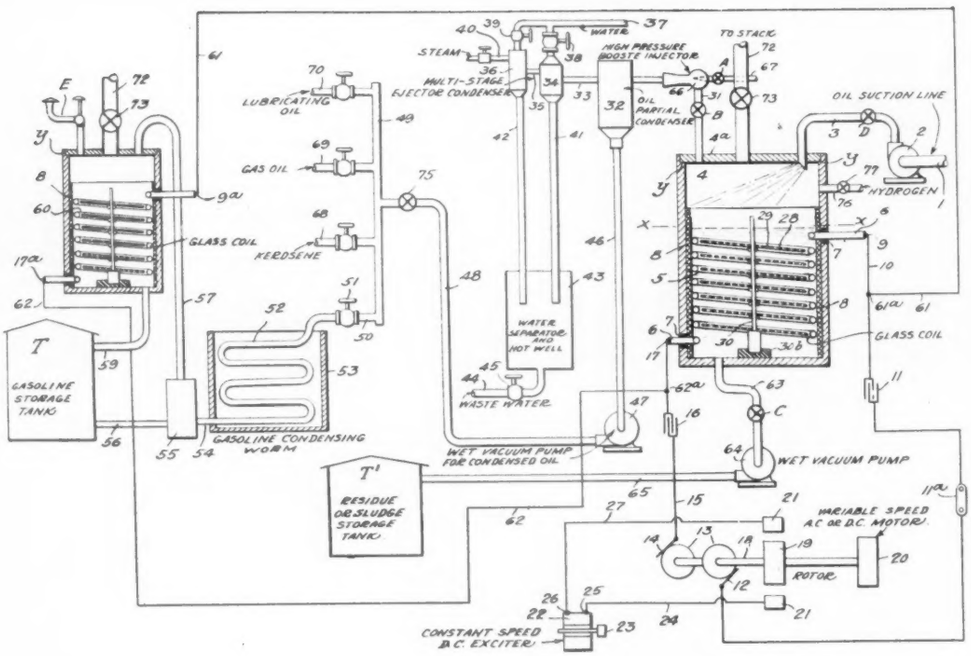

Fig. 3. View of electric light and electric wave emitting coil apparatus for producing dissociation and recombination of hydrocarbons (Fig. 1, Henry, Pat. No. 1,961,358)

presence of aluminum chloride, viscous oils, applicable as lubricants are obtained (Lilienfeld, Pat. No. 1,563,203).

Variations in the physical properties of mineral oils are due to differences in chemical constitution. In general, high viscosity index and low vapor pressure, are associated with a high hydrogen-to-carbon ratio. Oils can be produced by polymerization, which have high viscosity indexes. The latter property has been found to depend upon the length of the straight carbon-atom chains in the starting materials. Such oils are especially adapted to lubrication of mechanisms which are subject to temperature changes, notably, automobile transmissions, steering gears, shock absorbers, and aircraft engine service. Cracked paraffin wax products subjected to condensation with cyclic hydrocarbons yield lubricating oils of high viscosity index, according to Pungs, Rabe & Zorn, Pat. No. 1,938,088.

Synthetic oils having better viscosity-temperature gradients than Pennsylvania oils, are produced by polymerizing cracked hydrocarbon waxes, it is stated by Sullivan and Voorhees, Pat. No. 1,955,260, (See Fig. II). Condensation of chlorinated paraffin wax with diphenyl yields high viscosity index oils, MacLaren discloses in Pat. No. 2,030,832. Paraffin wax is the starting material also in the method described by Gardiner, Greene, and Lyman, in Pat. No. 2,082,203. The wax is dehydrogenated to form olefins, and the olefins are polymerized thus producing long chain compounds of high viscosity index. Waterman, Pat. No. 2,088,500, states that the low viscosity index of aromatic oils can be improved by reaction with acetylene.

End of Part I

1. De Hemptinne, 970,473. Sept. 20, 1910. Animal or vegetable oils are acted upon in a partial vacuum or in any gaseous atmosphere with an electric discharge which polymerizes the molecules.

2. Ellis, 1,089,359. Ellis-Foster Co. Mar. 3, 1914. Heavy petroleum oil is treated with ultra violet light whereby the oil becomes debloomed and gum-forming products are polymerized.

3. Brownlee, 1,309,432. July 8, 1919. Lubricating oil is manufactured from light hydrocarbons of petroleum distillates in the presence of a catalyst by the action of heat.

4. Klever, Lautenschlager and Gohring, 1,350,814. The Chemical Foundation Inc. Aug. 24, 1920. Lubricating oils are manufactured from coal tar oils or distillates of coal tar pitch embodying bases and phenols under heat and pressure.

5. Brownlee, 1,374,277. Apr. 12, 1921. A lubricating oil of synthetic production is obtained by treating a petroleum distillate, in the presence of a catalyst, at a temperature and with agitation to polymerize unsaturated hydrocarbons.

6. Eichwald and Vogel, 1,450,026. Mar. 27, 1923. Lubricating oil of good quality is produced from distillate of low temperature tar, by subjecting same to alternating electric currents during a polymerizing operation.

7. Ramage, 1,483,835. Bostaph Engineering Corp. Feb. 12, 1924. Polymerized olefins are obtained by sulfuric acid treatment. The product is fractionated.

8. Lilienfeld, 1,563,203. Nov. 24, 1925. High boiling viscous oily liquids are made by bringing acetylene into contact with coal tar hydrocarbons boiling above 140°C., in the presence of aluminum chloride.

9. Moody, 1,601,406. Sept. 28, 1926. A petroleum fraction, is subjected to treatment with aluminum chloride and a carbide. Hydrogen and hydrocarbons are evolved which apparently saturate or dehydrogenate the unsaturated elements of the oil rendering them non-sludging. Among other unsaturated bodies which can be similarly treated are unsaturated animal and vegetable oils and fats such as the fatty acids and their glycerides, etc.

10. McAfee, 1,608,329. Gulf Refining Co. Nov. 23, 1926. Solar or gas oils are warmed with aluminum chloride while supplying hydrogen-containing gases. By this means, saturated products of various boiling points are obtained, including lubricating oils.

11. Snelling, 1,624,848. Gasoline Products Co. Apr. 12, 1927. The action of heat and pressure upon oils does not go only one way. Equilibrium is approached between the amount of low boiling and high boiling produced by the treatment of oxides of carbon with hydrogen, in the presence of a catalyst, by heat and pressure. As an example, carbon monoxide and hydrogen are com-

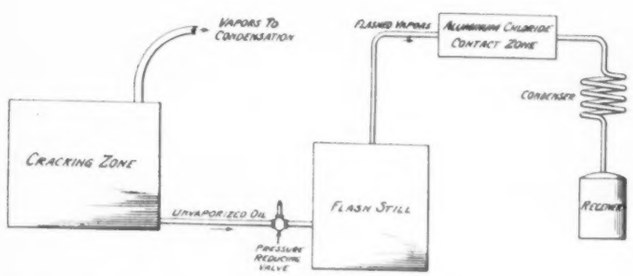

Fig. 4. Flow sheet illustrating Egloff process (Egloff, Pat. No. 1,960,625)

bined under a pressure of 200 atmospheres, in the presence of an iron-copper-cadmium catalyst, to form hydrocarbons of low boiling point consisting of propylene, butylene, isobutylene, pentylene, propane, butane, isobutane, pentane and ethylene. These hydrocarbons are treated with aluminum chloride under pressure, at 50° to 100°C., in an autoclave. A liquid is obtained from which valuable lubricating oils may be recovered by distillation.

13. Egloff, 1,850,869. Universal Oil Products Co. Mar. 22, 1932. A lubricating stock is made by the polymerization with molten aluminum chloride of a residuum from cracked petroleum oil.

14. Howes, 1,877,664. Imperial Chemical Industries Ltd. Sept. 13, 1932. A process for preparing lubricating oils which comprises contacting olefins with catalysts comprising essentially aluminum chloride and metallic aluminum or zinc, and fractionating.

15. Chappell, 1,878,262. Standard Oil Co. (Calif.). Sept. 20, 1932. A lubricating oil stock is produced, together with lower boiling products, by a condensation at approximately 212°F., with a metallic halide, of a high boiling oil of the carbocyclic series, and a chlorinated hydrocarbon gas of the paraffin series, followed by a further reaction with aluminum chloride at elevated temperature and pressure.

16. Michel, 1,878,963. I. G. Farbenindustrie A. G. Sept. 20, 1932. Reacting with an olefin upon a polynuclear hydrocarbon in the presence of a catalytically acting metallic halide and of an inert solvent.

17. Schmidt, Ernst, and Lange, 1,879,912. I. G. Farbenindustrie A. G. Sept. 27, 1932. Lubricating oils for refrigerating machines are made by the alkylation of naphthalenes with metal halides and metal oxides or other compounds capable of binding hydrochloric acid, for instance zinc chloride and zinc oxide or small quantities of iron chloride and zinc oxide at 160°C. to 180°C., and fractional distillation of the reaction products.

18. Halloran and Chappell, 1,893,774. Standard Oil Co. (Calif.). Jan. 10, 1933. Unsaturated oil derived from a sulfur dioxide extract of hydrocarbon oil is treated with aluminum chloride at a polymerizing temperature.

19. Grebe and Stoesser, 1,905,850. Dow Chemical Co. Apr. 25, 1933. Diphenyl oxide or mixture of same with aromatic hydrocarbons and oxygenated derivatives thereof, subjected to thermal treatment. A reaction product is then separated which is useful as a lubricant, transformer oil, and the like.

20. Pier and Christmann, 1,914,727. Standard-I. G. Co. June 20, 1933. Liquid hydrocarbon products are condensed in the presence of an anhydrous metal halide. The product thus obtained is subjected to a nondestructive reduction treatment with hydrogen in the presence of a catalyst comprising a compound of a metal of the 6th group of the periodic system.

21. Hofmann and Wulff, 1,933,434. I. G. Farbenindustrie A. G. Oct. 31, 1933. Cyclic hydrocarbons are condensed with olefins in presence of boron chloride.

22. Davis, 1,934,043. Standard Oil Dev. Co. Nov. 7, 1933. Process of improving lubricating oil which comprises the steps of preparing an activated hydrocarbon by treating petrolatum with aluminum chloride admixing such activated hydrocarbon with the lubricating oil and maintaining at an elevated temperature for a prolonged period, cooling and removing the excess of petrolatum and the aluminous sludge.

23. Winkler, Haeuber and Feiler, 1,937,619. I. G. Farbenindustrie A. G. Dec. 5, 1933. Lubricating oils, and motor fuels, have been produced by dehydrogenation of hydrocarbons, and subjecting the resulting gaseous olefins to polymerization at elevated temperatures, and if desired, increased pressures, and condensation. It is now found that certain objections may be overcome by using apparatus, the hot parts of which are made of silicon and silicon-containing materials, which have catalytic properties.

24. Pungs, Rabe and Zorn, 1,938,088. I. G. Farbenindustrie A. G. Dec. 5, 1933. Lubricating oils having a flat temperature-viscosity curve are made by subjecting a mixture of cyclic hydrocarbons with cracked paraffin wax, to the action of an anhydrous halide, between ordinary temperature and 150°C.

25. Bray and Swift, 1,948,163. Union Oil Co. of Calif. Feb. 20, 1934. Lubricating oils are produced by treating substantially asphalt-free oils with aluminum chloride at a temperature below which any substantial cracking takes place to transform the unsaturated oils into saturated oils.

26. Bray and Swift, 1,948,164. Union Oil Co. of Calif. Feb. 20, 1934. Lubricating oil is produced from an asphalt-containing oil by contacting the oil which has been freed from asphalt with aluminum chloride at a temperature sufficiently high to convert the unstable hydrocarbons into reaction products.

27. Sullivan and Voorhees, 1,955,260. Standard Oli Co. (Indiana). Apr. 17, 1934. Synthetic hydrocarbon lubricating oils which have low viscosity-temperature coefficients, low specific gravity, and low carbon forming tendency are formed by first converting hydrocarbon wax into a material of lower hydrogen content and then treating the material with aluminum chloride at an elevated temperature whereby it is converted into a polymerized product from which the oil may be separated. An important characteristic of these oils is their low pour point. (Fig. 2.)

28. Egloff, 1,960,625. Universal Oil Products Co. May 29, 1934. Viscous fractions suitable for lubricants are produced by contacting certain portions of cracked heavy hydrocarbon oils with aluminum chloride under conditions conducive to the formation of lubricating oil fractions, and condensing the product. (Fig. 4.)

29. Henry, 1,961,358. Ionizing Corp. of America. June 5, 1934. Hydrocarbon material is vaporized in a field generated by electric lightray and electric wave emitting tubes or coils and converted into lubricating oil or gasoline, depending in the frequencies established in the electromagnetic fields and power applied.

End of Part I

To be concluded in an early issue

D. E. Fields, vice-president of Tulsa Boiler & Machinery Co.

TULSA, Feb. 5.—D. E. Fields has been elected vice-president of Tulsa Boiler & Machinery Co. of Tulsa, Okla.

Mr. Fields graduated from the School of Mechanical Engineering of the University of Oklahoma in 1925, and has been on the staff of the Tulsa company since then. He is chief engineer and in charge of sales.

"State of the Art" AS SEEN

IN THE WORLD'S CURRENT TECHNICAL LITERATURE

By M. G. VAN VOORHIS
N. P. N. Staff Writer

Dewaxing Solvent

Methyl normal-butyl ketone is a comparatively excellent dewaxing solvent from several points of view. O. S. Pokorny and R. K. Stratford, Jour. Inst. Pet. Tech., Dec., 1937.

From the view-point of wax solubility, miscibility temperature with oil, filter rates and cold test-dewaxing temperature relationship, methyl *n*-butyl ketone is an excellent dewaxing solvent. Its vapor pressure is such as to minimize evaporation losses. It is stable and non-corrosive under distillation conditions. It is non-toxic and, due to its characteristic odor, its presence can be detected before the concentration reaches the lower explosive limit. The cost is reasonable and in the range of solvents already employed in dewaxing.

One of the attractive features of *n*-butyl ketone as a solvent for dewaxing purposes is the high filter rate obtained at relatively low dilutions. A number of experiments on Mid-Continent distillates has shown that the dewaxed oil has a pour point in many cases lower than the dewaxing temperature. The fact that a comparatively high dewaxing temperature may be employed to obtain a given cold test is of considerable importance from both the installation and operation points of view, as it indicates that a minimum of refrigeration will be required.

The boiling point of 258° F. is such that either atmospheric or vacuum distillation methods of recovery may be applied without difficulty and separation from the oil is a simple matter.

* * *

Pipeline Corrosion

*Discontinued pipeline coating studies are summarized. No way of expressing serviceability of a coating has been found. K. H. Logan, Bureau of Standards Research Paper RP*1058.

Although protective coatings have been applied to pipe lines and tests made for many years, little data is available for making reliable estimates of possible savings. No recognized way of expressing the serviceability of a coating has developed, even with 15 years of tests by the Bureau of Standards. Chief among the reasons are variability of soil conditions, shrinkage and relative density of solids which distort coatings.

Almost all coatings materially reduced the loss of metal during the period of test but none completely prevented corrosion for as long as four years. Coatings which are somewhat porous, such as cut-backs and asphalt emulsion, are effective in preventing pitting in well aerated soils. Coal-tar-base coatings absorb less water and have better insulating qualities than coatings having asphalt as a base but they are more severely affected by soil stresses, sudden changes in temperature, and shocks.

Application of coatings by means of a sling as used in the American Petroleum Institute tests results in imperfect coatings. Shields and reinforcements have been found to reduce the depth of the deepest pit during the first few years of exposure but perhaps no more than it would be reduced by equivalent thickness of a bituminous coating Asbestos felt gives more permanent reinforcement to bituminous materials than rag felt. No bituminous coating has been found to be greatly superior to all others. These are some of the conclusions drawn in summarizing 15 years of testing.

In the application of data to pipelines it is not possible to say that one material should be generally used in preference to any other. Selection can be governed only by such data as given above, supplemented by data as to availability, ease of application, suitability of the material for local field and labor conditions, and the estimated cost throughout the life of the line.

Pit depth on any chosen area of protected pipe can be compared with a similarly coated test specimen by application of Scott's pit-depth-area relation:

$$P_2 = P_1(A_2/A_1)^a$$

in which A_2 and A_1 are the areas from which the pit depths P_2 and P_1 are selected and a is a function of soil characteristics ranging from 0.376 to 0.150 and averaging 0.261.

If the average value of a is assumed, the reinforced asphalt coating increased the length of pipe per leak to about 28 times that of unprotected pipe, which is more than sufficient to pay for the application of the coatings but not enough to be considered satisfactory protection. Reinforced pitch coating was the most effective. It reduced leaks on thick steel main to about one in 21 miles of main.

Estimates of effectiveness are based on the performance in corrosive soils rather than in those which are destructive to coatings. If the coating had been exposed to soils having large shrinkages the results might have been less favorable. Light-weight pipe protected by a very good coating appears to be superior to an unprotected thick-walled pipe during the first 12 years of exposure, and thick-walled pipe is superior if the coating does not reduce the leaks to a very small percentage of those on bare pipe. For example, the formula will show, when a is average, that a coating must reduce the leaks on a coated light-weight 8-inch steel pipe to 0.27 per cent of those on bare pipe in order to equal the service of an 8-inch class B cast-iron pipe. If the pipe is in a uniform soil, for which the value of a is 0.15, it is necessary to reduce the leaks to 0.004% of those on the bare thin pipe, i. e., the coating must prevent practically all leaks.

The effect of fabric reinforcement with asphalt coating was determined at the end of four years and at the end of 12 years. At the close of the shorter test period 65% of the reinforced specimens were rusty as compared with 74% of the unreinforced. At the end of 12 years 78% of the reinforced specimens showed measurable pits as compared with 48% of the unreinforced specimens. Cotton fabric was therefore considered to be a detriment, probably acting as a wick to carry water into the material. Bitumen-impregnated organic and asbestos felts improved the situation somewhat.

A comparison of the data for the unreinforced enamels with those for the shielded enamel indicated that the shield materially reduced the pit depths at all sites, although the shielded enamel was not as thick as the average of the unshielded enamels. The use of burlap is extensive in some countries but has been discontinued largely in the United States because of the tendency of the fibers to pro-

Some Notes on –

ALCO GYRO
VAPOR PHASE CRACKING

The high octane motor fuel produced from the Gyro Process is characterized by high volatility and high energy content.

The flexibility of this process permits the use of any reduced crude as a charge for the production of unsaturate gases used for the making of chemicals and solvents.

Asphaltic impurities in the crude charge are quickly and easily removed without the necessity of any special treating.

Low pressures and high temperatures are inherent in the operation under which high yields of quality by-product gases are produced.

High octane blending gasoline and aromatic solvents are produced daily in polymerization plants using Gyro unsaturate gases as raw material.

Licensing Agents for: Pure Oil Polymerization Process, Gyro Vapor Phase Cracking, Gray Process Clay Treating.

ALCO PRODUCTS

DIVISION OF

AMERICAN LOCOMOTIVE COMPANY
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AMERICAN LOCOMOTIVE SALES CORP.
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trude through the coating and to act as small capillaries which conduct water into the coating.

In a four-year test the emulsion type of asphalt coating reinforced by a heavy layer of sand and cement mortar appeared to have been somewhat more effective than other coatings. In general, none of the reinforced coatings tested were outstanding and it is an important fact that the same degree of effectiveness can be secured in several ways. More data will be needed to define the engineering principles upon which a coating should be designed. To obtain such data was the purpose of the A.P.I. coating tests.

Several manufacturers and pipeline operators have suggested greases as a means of retarding the corrosion of pipelines. The grease contained a material intended to inhibit corrosion and the fabric was treated to prevent decay. At the end of a 4-year period the fabric-reinforced grease appeared to be as effective in reducing pit depths as any coating of its thickness and more effective than several thicker coatings. Experience indicates they seem to render their best service in soils which are continuously wet and to fail soonest in soils that frequently become very dry. Of all the coatings in the A.P.I. tests the mastic coating was the best for the first four years. This coating was made of a mixture of asphalt and graded mineral matter applied by machine to a thickness of 0.519 inch.

* * *

Polymerization of Propylene

Mechanism of polymerization of propylene by dilute phosphoric acid appears inconsistent with results with concentrated acid. L. A. Monroe and E. R. Gilliland, Ind. Eng. Chem., Jan. 1938, *p.* 58.

In experimental polymerization of propylene using dilute phosphoric acid at a catalyst, a stepwise procedure is employed in which the first product is dimer which reacts with more propylene to form trimer, and the latter then combines with more propylene to form tetramer. The reactions take place above 480° F. and at 150 atmospheres pressure.

When the temperature goes above 570° F. and concentrations of acid are over 30%, the character of the polymer changes, an excess of heavier compounds forming at the expense of the yield of dimer. Below these limits, however, the composition of the products depends solely on the extent of the polymerization of the feed and varies from practically pure dimer to 35% dimer at nearly complete reaction.

In this range the rate of dimer formation from propylene is closely proportional to the square of the reactant concentration in the gas phase above the acid catalyst, as well as to the volume and concentration of the catalyst.

The significance of these results is in showing the ability to control the volatility of polymers from normal olefins through a wide range by varying the percentage polymerization of the feed—i. e., in continuous operation by varying the recycle ratio. The results also contrast sharply with results in using 100% phosphoric acid in which relatively little dimer formation from propylene occurs, trimer being the dominant product. The conclusion seems unavoidable that, as the concentration of a phosphoric acid polymerization catalyst is increased, the nature of its catalytic action changes in such a way as to cause marked decrease in the amount of dimer formed and corresponding marked increase in the amount of heavier polymers produced.

The rate of polymerization is found to be closely proportional to the first power of the concentration of the dilute phosphoric acid catalyst in which it occurs and to the square of gas-phase propylene concentration. If accepted, this result yields a criterion by which to test the applicability of mechanisms proposed to explain the means by which acids polymerize olefins. Deductions from experimental results shows the acceptability of Berthelot's mechanism in explanation of olefin polymerization by dilute phosphoric acid. Consistency between results and Berthelot's mechanism, however, does not prove it to be the correct one.

The statement, apparently inconsistent with Ipatieff's evidence for the occurrence of polymerization by the mechanism he has described, may not improbably be reconciled with Ipatieff's views by an assumption. This assumption is that, in general, polymerization reactions following these two, and possibly other mechanisms, occur side by side. Under certain circumstances (as in dilute acid) one of these mechanisms is predominant over the others. This assumption can be tested by further study of rate data.

* * *

Lacquer Solvents from Olefins

Reaction time in synthesis of esters from olefins is reduced to 15 *minutes. T. W. Evans, K. R. Edlund, and M. D. Taylor, Ind. Eng. Chem. Ind. Ed., Jan.,* 1938.

Increasing demand for esters as lacquer solvents and the realization that the olefins available from cracking processes can serve as source materials has prompted investigation into the development of a commercially feasible synthesis involving study of the equilibria involved, rates of reaction, and means of recovering the products formed. Yields of ester of 97-100% purity were secured, the impurities being hydrocarbons and alcohols, which are acceptable.

The experimental results were restricted mainly to the use of acetic acid, since this is the cheapest and most used acid available, and sulfuric acid was used as a catalyst. Four- and five-carbon olefins were used chiefly. From the butylenes two acetates are available: *tert*-butyl acetate from isobutylene and *sec*-butyl acetate from 1- and 2-butenes. The amylenes similarly can provide one *tert*-amyl and three *sec*-amyl acetates. Commercially, the secondary esters have found numerous uses but the tertiary esters are virtually unused.

Reactions were found not to be simple and an equilibrium is reached which is not complete. In contrast to discussion in patent literature which indicated a preference for the presence of a single liquid phase, the writers found the presence of two liquid phases is desirable. Reaction time, specified in various patents from two to 72 hours, was reduced to 15 minutes or less.

In a typical experiment a mixture is made of 106 grams of acetic acid, 109 grams of sulfuric acid (95%), and 419 grams of a pentene-pentane mixture containing 65% pentanes, 2% *tert*-pentenes, and 33% *sec*-pentenes. This mixtures is stirred under pressure in an autoclave at 140° F. for two hours, then cooled and drained.

In the upper layer which is formed, the amyl acetate concentration is six times the acetic acid concentration. Sulfuric acid and most of the unreacted acetic acid are confined to the lower layer, which amounts to 212 grams. Only the upper layer is worked to recover amyl acetate and the lower layer is re-used, being recirculated continuously without leaving the system. In 40 runs little variation in acid and ester content appeared. Nearly complete conversion of the olefin to ester in one step was found impractical since this calls for too high an acetic acid concentration.

Recovery of ester and unreacted acid involves contacting the upper layer with an aqueous acetic acid solution of such concentration that it is substantially at equilibrium with the upper layer as it leaves the esterification reactor. A metal acetate contained in solution facilitates the extraction of free sulfuric acid into the aqueous phase while practically no exchange of acetic acid takes place. Metal sulfate, built up until the solution is saturated and precipitation takes place, is filtered. The final result is to replace the free sulfuric acid by an equivalent amount of acetic acid which is re-extracted into the hydrocarbon layer.

Dialkyl sulfates are not removed by this treatment but may be rendered innocuous during subsequent distillation by the presence of a little barium or calcium acetate. Distillation is employed for recovering amyl acetate but is not satisfactory with *sec*-butyl without some variation.

Effect of Carburetion and Manifolding On Anti-Knock Ratings in Multi-cylinder Engines

PART 2

By EARL BARTHOLOMEW*, HAROLD CHALK*, and BENJAMIN BREWSTER*

(*Continued from Jan. 26 Issue*)

Abstract

● As air-fuel ratio changes, knocking tendency changes so that the anti-knock rating of two fuels may be reversed, depending on the richness or leanness of mixtures.

Differences in method for heating manifold mixture change the air-fuel ratio and the knock tendencies of fuels, or of the same fuel under different conditions.

Spark timing varies from cylinder to cylinder at the same "setting," and an apparatus has been developed by these authors for determining spark timing exactly, using a neon tube and photographic film drum arrangement.

Volatility of reference test fuels should approximate that of average commercial gasoline.

FOR the same conditions of operation, the mean air-fuel ratio is normally richer than that shown in Table II.† There is however always a tendency for a portion of the heavy ends of the acceleration charge to lag behind the air-vapor mixture for a short period after the sudden opening of the throttle, with the result that the mean cylinder air-fuel ratio is momentarily leaner than after the lagging liquid fuel starts to flow into the cylinders. This may in part account also for the difference between the mean air-fuel ratios for the two groups of cylinders inasmuch as the manifold for cylinders 1, 2, 7 and 8 is longer than that for the remaining cylinders and has more surface to be wet by the acceleration charge. It should be noted that the rear cylinder of each group receives the richest mixture, presumably because of the forward motion of the car which tends to cause liquid fuel to accumulate in the rear of the manifolds.

The air-fuel ratio of the mixtures in cylinders 1, 2, 7 and 8 varies from 12.37 to 16.01. Often the variation is greater. The mechanism by which fuel and air are delivered to the cylinders in such a wide range of proportions appears to be as follows:

Air and fuel are metered by the carburetor and enter the manifold. The magnitude of the fraction of the fuel in the vapor state as the mixture leaves the manifold is a function of the heat in the fuel and air supplied to the carburetor, the heat added by the manifold, the volatility and latent heat of the fuel and the efficiency of mixing in the manifold. Although the available heat may be adequate to ensure complete vaporization under equilibrium conditions, the time of contact and degree of mixing in the manifold may not be sufficient to bring about this condition.

The air and the lighter fractions of the fuel, vaporized in the carburetor and manifold, are distributed substantially equally to the cylinders . A part of the unvaporized, less volatile portion is distributed fairly uniformly by entrainment with the air but the quantity of heavy ends so distributed becomes less as engine speed decreases and appears to be small at low engine speed.

The remainder of the heavy liquid portion is distributed unequally to the cylinders, the quantity entering any given cylinder depending on the shape, cross-sectional area and inclination of the manifold, engine speed, surging of the mixture within the manifold and other factors. Thus, in the three typical cases, one or more cylinders may receive substantially only air and the lighter ends which leave the manifold in the vapor state; others may receive air, vaporized light ends and liquid heavy ends in approximately the same air-fuel ratio as that of the mixture leaving the carburetor and still others may receive air, vaporized light ends and liquid heavy ends in the same proportions as in the second case plus the liquid heavy ends which, under conditions of perfect distribution, would have entered the first mentioned cylinder or group of cylinders. Other cylinders may receive liquid heavy ends in any amounts between the two limits just described and it would be possible for one or more cylinders to receive even more liquid heavy ends than the richest cylinder cited. The three typical distribution conditions are summarized in Table III in which the fuel entering the carburetor is assumed to contain L lbs. of light ends, which leave the manifold in the vapor state, for each H lbs. of heavy ends that leave the manifold in the liquid state.

TABLE III

Three Typical Fuel Distribution Conditions in the Multi-Cylinder Engine

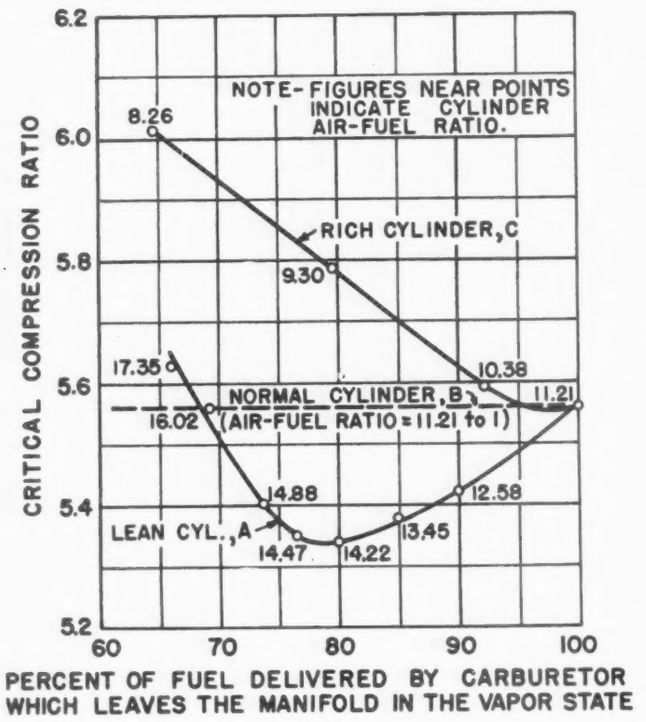
Cylinder Type	Received by Cylinder: Air, Lbs.	Vaporized Light Ends, Lbs.	Liquid Heavy Ends, Lbs.	Cylinder Air-fuel Ratio	Carburetor Air-fuel Ratio	Cylinder Mixture Strength Relative to Carburetor
A	M	L	O	$\frac{M}{L}$	$\frac{M}{L+H}$	Leaner
B	M	L	H	$\frac{M}{L+H}$	$\frac{M}{L+H}$	Equal
C	M	L	2 H	$\frac{M}{L+2H}$	$\frac{M}{L+H}$	Richer

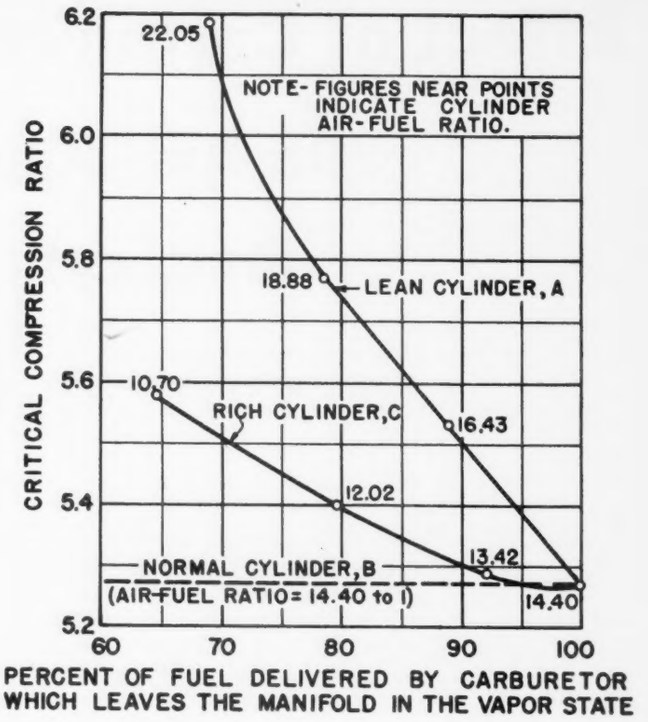
$$\text{Mean air-fuel ratio} = \text{carburetor air-fuel ratio} = \frac{3}{\frac{L}{M}+\frac{L+H}{M}+\frac{L+2H}{M}} = \frac{M}{L+H}$$

Assume for example in the case of cylinder group 1, 2, 7 and 8 of the engine in Table II that the average cylinder air-fuel ratio was equal to the carburetor air-fuel ratio, that no liquid fuel was distributed by entrainment and that the leanest cylinder received only vaporized fuel, in an amount

*Ethyl Gasoline Corp.

†N. P. N., Jan. 26, p. R-34.





Figs. 6 & 7. Effect of unequal distribution of fuel in the manifold on critical compression ratios of individual cylinders of an engine where a typical commercial lead-free base stock is used. Fig. 6. Air-fuel ratio at the carburetor is 11.21

equal to that distributed to each of the remaining cylinders, along with varying amounts of liquid fuel. The fraction of the fuel entering cylinders 1, 2, 7 and 8 which left the manifold in the vapor state was $100 \times \frac{14.4}{16.01} = 90.0\%$. If M in Table III is taken as 1 lb., (L+H) for cylinders 1, 2, 7 and 8 was $\frac{1}{14.4} = 0.0695$ lb. L was $\frac{1}{16.01} = 0.0625$ lb. H was $0.0695 - 0.0625 = 0.0070$ lb. $\frac{M}{L+2H} = 13.08$, which is the air-fuel ratio that would have existed in one or more of the cylinders if they had received air and fuel in the same proportions as cylinder C of Table III. Actually no cylinder in this group received such a mixture but cylinder 8 received a mixture having an air-fuel ratio of 12.37, or 0.0809 lb. fuel per lb. of air, consisting of L lbs. of vaporized light ends and 2.63 H lbs. of liquid heavy ends.

Effect of Variable Fuel Distribution on Knocking in the Cylinder

The non-uniform distribution of fuel to the cylinders as described above gives rise to two conditions which are of vital importance in the fuel knocking problem, viz.:

1. The air-fuel ratios of the mixtures in the cylinders may vary widely and cause a substantial variation in knocking tendency among the cylinders.

2. The composition of the fuel in the cylinders may be quite different and cause a variation in knocking tendency in addition to that introduced by the differences in air-fuel ratios.

Because of these conditions, independent of all others, there is ample cause for a marked variation in the knocking tendency of the fuel in the individual cylinders of an engine operated under conditions of imperfect distribution. Whether the cylinders of Type A, B or C have the greatest knocking tendency depends on the following three factors:

1. The carburetor air-fuel ratio.

2. The degree of vaporization and hence the magnitude of the variation in cylinder air-fuel ratio.

3. The relative concentration of antiknock value in the vaporized light ends and the unvaporized heavy ends of the fuel.

The Adaptation of the Single Cylinder Engine for the Study of Distribution

The laboratory knock testing engine, operated in the conventional manner, permits no prediction of the behavior of a fuel under variations of the three conditions just enumerated. Under such a procedure it is useful only for the evaluation of the knocking tendency of a fuel under a range of cylinder conditions when the composition and air-fuel ratio of the mixture entering the cylinder are the same as for the mixture leaving the carburetor.

A fundamental study on a multicylinder engine of fuel distribution and its effect on knocking is surrounded by many difficulties. The richness of the mixture which enters the several cylinders can be determined most conveniently by exhaust gas analysis as previously described. The knocking tendency of the fuel in the individual cylinders is not measurable by any instrumentation developed to date but can be evaluated by audibility methods to be described later. The maintenance of constant conditions of operation is difficult because of uncontrollable variations in ignition timing and temperatures. It is, therefore, highly desirable to adapt the C.F.R. engine to the study of this problem inasmuch as the above-mentioned variations in operating conditions have been minimized.

Fig. 3* shows four intake manifolds for the C.F.R. engine which have been designed to permit a study, under controlled conditions, of the effects on knocking caused by variations of fuel distribution in the multicylinder engine. In the arrangement shown in Fig. 3a, a short spacer bolted directly to the engine cylinder is fitted with a thermometer for the indication of mixture temperature. A standard C.F.R. manifold, with its mixture heater, is bolted to the spacer, the flange normally bolted to the carburetor being attached to the spacer. A specially designed water-jacketed manifold section is provided with two flanges, one of which is connected to the standard C.F.R. manifold and the other to the standard C.F.R. carburetor body.

After the fuel-air mixture leaves the carburetor, it is forced to flow down through the jacketed section of manifold and up through the standard C.F.R. manifold before entering the cylinder. Unvaporized fuel which is not car-

*N. P. N., Jan. 26, p. R-32.

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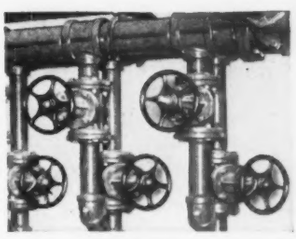

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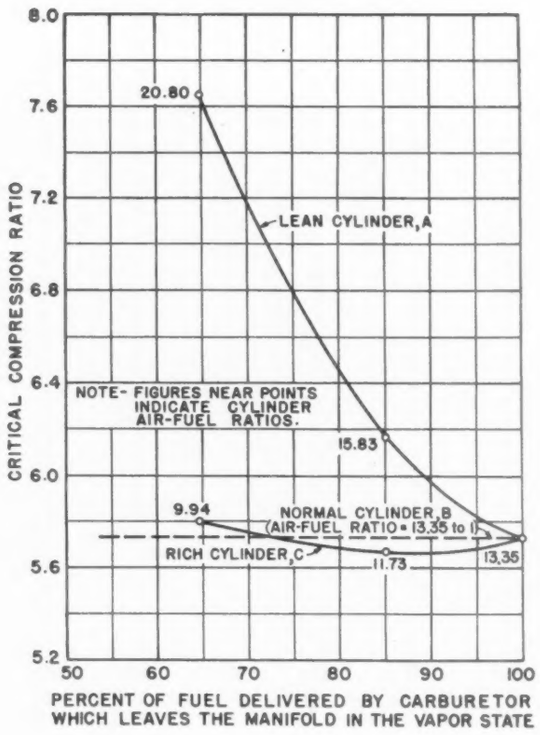

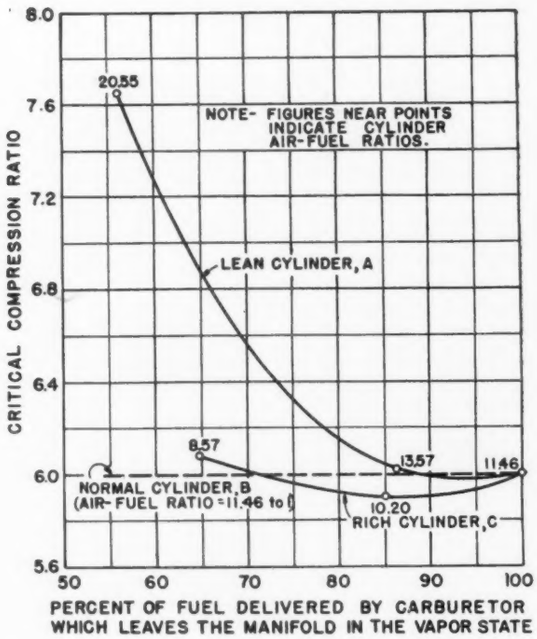

Figs. 8 & 9. Effect of unequal distribution of fuel in the manifold on critical compression ratios of individual cylinders of an engine where a fuel with summer volatility (S-11) and extreme concentration of antiknock in light ends is used. Fig. 8. Air-fuel ratio at the carburetor is 11.46. Fig. 9. Air-fuel ratio at the carburetor is 13.35 (maximum knock).

ried into the cylinder by entrainment in the air stream drains from the jacketed section of manifold into a graduated burette. The degree of fuel vaporization is controlled by the temperature of the water that enters the manifold jacket. Water is heated or cooled externally and mixed with tap water to produce the temperature required to effect the desired degree of vaporization. Any final mixture temperature higher than that existing in the jacketed manifold may be obtained by the use of the standard C.F.R. mixture heater.

In order that the rate of carburetor fuel consumption may be measured, the standard C.F.R. integral float bowl and fuel container assemblies are replaced by separate float bowl and fuel container assemblies from the Series 30 engine. Three-way cocks and graduated glass bulbs permit the volumetric measurement of fuel entering the carburetor. An air conditioning unit, as described in the June, 1937, issue of the S.A.E. Journal, p. 250, maintains carburetor air at constant temperature and humidity and provides for air measurement by means of a round edge orifice similar to that described in the 1936 Transactions of the S.A.E., p. 97.

The arrangement shown in Fig. 3b has been found to effect a more complete separation of liquid fuel from the mixture of air and vaporized fuel and thus to simulate more closely the functioning of the multicylinder engine manifold. Essentially it is the setup shown in Fig. 3a with the regular C.F.R. manifold and special jacketed section reversed in position. Variation in the position of the piston in the surge cylinder attached to the liquid fuel drain at the bottom of the manifold permits, with little or no application of heat to the manifold, a wide range of adjustment of the fraction of the fuel drained from the manifold in the liquid state. It is impossible however to obtain with this manifold a final mixture temperature higher than that of the liquid in the jacket. This prevents operation with cylinder conditions having a severity much in excess of those for the Research Method.

The manifold shown in Fig. 3c permits the use of any desired final mixture temperature higher than approximately 200° F., effects as good separation of vaporized and liquid fuel as the manifold shown in Fig. 3b and requires no surge chamber. The separating chamber has a cross-sectional area over four times as great as that of the remainder of the manifold and consequently reduces the velocity of flow to a point that ensures good separation of liquid fuel from the stream of air and vaporized fuel. Heat may be applied to the mixture by conventional immersion heaters before or after it enters the separating chamber and the chamber itself may be heated or cooled by the circulation of water through the surrounding jacket.

The manifold of Fig. 3d is of the same essential design as that of Fig. 3c but is provided with 3 separating chambers instead of one. Experience to date with this design is insufficient to indicate whether it possesses any significant advantage over that shown in Fig. 3c.

Knock Ratings with the Bleed Manifold

After the carburetor float level and manifold jacket temperature have been adjusted to give the desired carburetor and cylinder air-fuel ratios respectively and the final mixture temperature has been brought to the desired figure, the general procedure for making knock ratings with the modified manifold is the same as for the Motor Method. The compression ratio is adjusted for standard knock intensity and the bouncing pin indicator is used to measure knocking tendency.

If the primary reference fuels are used, the fuel octane numbers obtained are likely to differ considerably, under conditions of partial fuel vaporization, from those obtained by the use of the approved secondary reference fuels. Within the range of manifold conditions of practical interest, the vaporization of heptane-octane mixtures is substantially complete, hence octane numbers obtained by the use of the primary reference fuels have the same meaning as those obtained by the Motor or Research Methods or by any other method which employs the conventional manifold. On the other hand, the volatility of the C-10 and A-5 reference fuels is quite different, therefore, under any condition of partial vaporization a larger fraction of the C-10 component is vaporized in the manifold. As the concentration of A-5 in the blend is increased, the percent of the blend leaving the manifold in the vapor state is decreased and the inherent anti-knock value of the reference fuel mixture which enters the cylinder decreases less rapidly than the percent of C-10 in the blend. The result is that under these conditions a given increment of antiknock value matched

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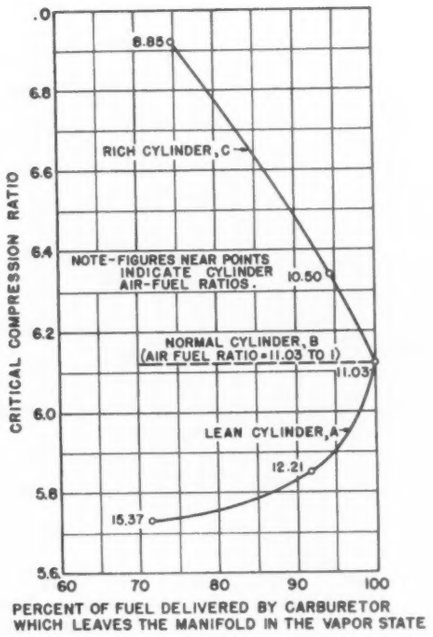
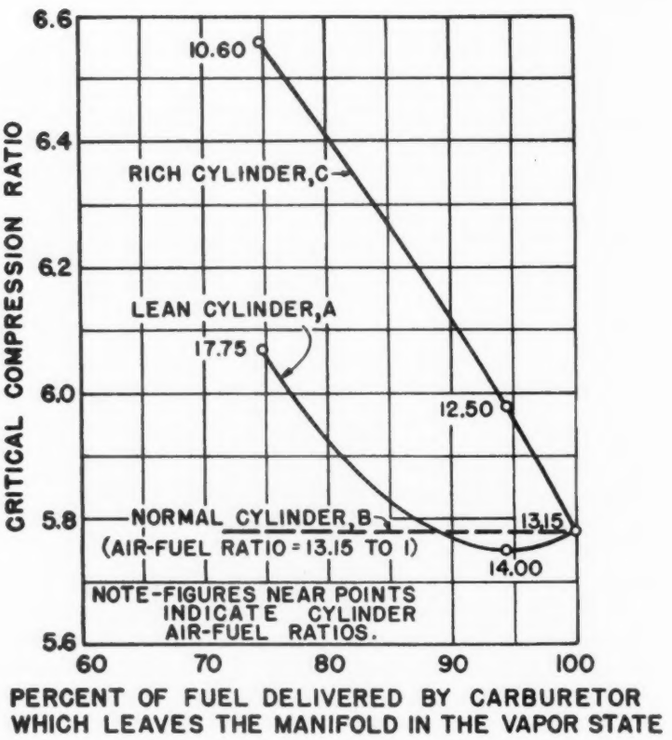

CRITICAL COMPRESSION RATIO
8.85
RICH CYLINDER, C
NOTE-FIGURES NEAR POINTS INDICATE CYLINDER AIR-FUEL RATIOS.
10.50
NORMAL CYLINDER, B (AIR FUEL RATIO = 11.03 TO 1)
11.03
LEAN CYLINDER, A
12.21
15.37
PERCENT OF FUEL DELIVERED BY CARBURETOR WHICH LEAVES THE MANIFOLD IN THE VAPOR STATE



Figs. 10 & 11. Effect of unequal distribution of fuel in the manifold on critical compression ratios of individual cylinders of an engine where a fuel with winter volatility (S-6) and extreme concentration of anti-knock in the heavy ends is used. Fig. 10. Air-fuel ratio at the carburetor is 11.03. Fig. 11. Air-fuel ratio at the carburetor is 13.15 (maximum knock).

against blends of the secondary reference fuels is interpreted as representing a larger difference in octane numbers than when matched directly against the primary reference fuels. The same condition presumably exists during road knock tests and raises the question of the possible relation between it and the occasionally observed relative insensitivity of cars to changes in the percent of C-10 in the blends of the secondary reference fuels.

When a measure of the difference in knocking tendency of fuels under conditions of imperfect distribution is desired in units bearing a definite relation to critical compression ratio, it is customary to make the comparisons directly against heptane-octane mixtures. When the problem is to correlate laboratory ratings with those obtained on the road with the secondary reference fuels, the latter reference fuels are used in the laboratory. If the conditions of engine operation on the road are duplicated in the laboratory, the fractions of the reference fuel blends delivered by the carburetor that leave the manifold in the vapor state are the same in both cases. If the octane numbers in terms of the primary reference fuels are to be determined at one time for one or more fuels at several degrees of imperfect vaporization, it is customary to determine the compression ratio for each that produces a knockmeter reading of 50 and to read octane numbers from a curve of octane number versus compression ratio for constant knock intensity, made at the conclusion of the tests.

When the degree of vaporization is low, as for example 50 to 60 per cent, the unsteady state following a change from one fuel to another is of quite long duration. In any case where vaporization is not perfect the unsteady state persists for a longer period than under the Motor Method conditions. There appears to be no way at constant speed of the laboratory engine to shorten the period of transient conditions. In tests on the road the car engine is usually operated at high speed for a brief period, following a change from one fuel to another, during which the manifold is more quickly washed clean of the previous fuel. A multi-speed, power-absorption generator and larger samples of fuel should permit a similar procedure in the laboratory.

Variation of Cylinder Air-Fuel Ratio

It has been pointed out in Table III that imperfect distribution causes some cylinders of the multicylinder engine to receive mixtures richer and leaner respectively than that leaving the carburetor while others may receive a mixture having substantially the same composition and air-fuel ratio as that leaving the carburetor. Inasmuch as the knocking tendency of the fuel in the cylinder is influenced markedly by air-fuel ratio as well as by the composition of the fuel, it is interesting to investigate the combined effect of these two variables resulting from imperfect distribution of the fuel in the multicylinder engine. It is possible to predict for any given fuel the relative knocking tendency of the several cylinders by the construction of any one of a number of different charts, after a series of tests of the fuel made on a C.F.R. engine equipped with one of the manifolds shown in Fig. 3. The type of chart which is most satisfactory depends on the information desired.

Inasmuch as the most frequent problem is the prediction of the relative knocking tendency of a group of fuels in a single car under a given set of conditions, the most valuable type of chart is usually one constructed on the basis of constant carburetor air-fuel ratio. The chart of Fig. 6 is constructed at a carburetor air-fuel ratio of 11.21 for fuel S.E.G.M. No. 2 which is a typical commercial, regular grade, lead-free base gasoline comprising a mixture of straight-run and cracked stocks. The scale of ordinates is critical compression ratio, defined as the compression ratio required for a knockmeter reading of 50. The scale of abscissae is the percent of the fuel delivered by the carburetor which leaves the manifold in the vapor state.

Data for the construction of the curve for Cylinder A are obtained by operating the engine at the desired speed, spark advance and final mixture temperature and, by adjustment of manifold temperatures, varying the percent of the fuel delivered by the carburetor which is bled from the manifold in the liquid state. The compression ratio for a knockmeter reading of 50 is determined for each rate of fuel bleeding and the curve is drawn through the points so determined. If the air and fuel passing through the carburetor and the liquid fuel bled from the manifold are measured, it is possible to compute the air-fuel ratio of the mixture which enters the cylinder. This information is shown beside some of the data points in Fig. 6.

The air-fuel ratio and composition of the mixture in cylinder A under the condition of complete fuel vaporization would apply to the normal cylinder B of the multicylinder engine regardless of the degree of fuel vaporization

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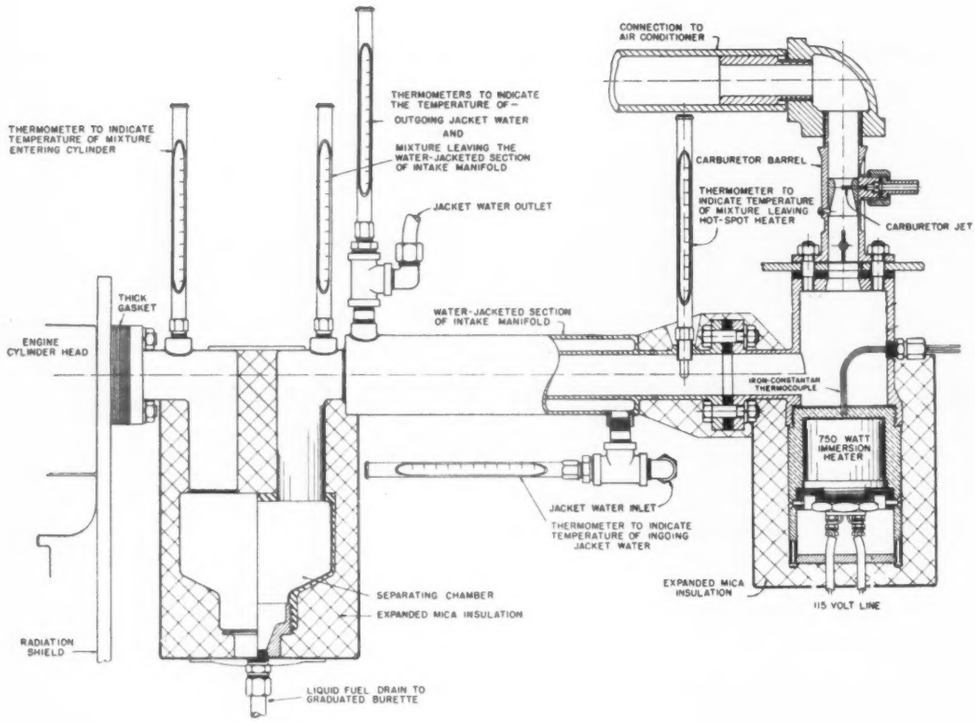
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CARBURETOR BARREL
THERMOMETER TO INDICATE TEMPERATURE OF MIXTURE LEAVING HOT-SPOT HEATER
CARBURETOR JET
THICK GASKET
WATER-JACKETED SECTION OF INTAKE MANIFOLD
ENGINE CYLINDER HEAD
IRON-CONSTANTAN THERMOCOUPLE
750 WATT IMMERSION HEATER
JACKET WATER INLET
THERMOMETER TO INDICATE TEMPERATURE OF INGOING JACKET WATER
SEPARATING CHAMBER
EXPANDED MICA INSULATION
EXPANDED MICA INSULATION
115 VOLT LINE
RADIATION SHIELD
LIQUID FUEL DRAIN TO GRADUATED BURETTE

Fig. 12. Modified single cylinder engine manifold and associated equipment for the study of the relative efficiency of air and mixture heating in the vaporization of fuel

in the manifold. The curve for cylinder B therefore is a straight line, parallel to the horizontal axis, and intersecting the curve for cylinder A at the 100 percent vaporization point.

It will be recalled that cylinder C of Table III receives a normal charge plus the liquid heavy ends which, under conditions of perfect fuel distribution, would have entered cylinder A. Data for the construction of the curve for cylinder C are determined in the manner previously described. When vaporization is complelte in the manifold, H becomes zero and the curve for Cylinder C has a point in common with the curves for cylinders A and B.

Fig. 5* shows that the lighter fractions of fuel S.E.G.M. No. 2 have the higher antiknock value, nevertheless, Figure 6 indicates that under conditions of imperfect fuel distribution at a carburetor air-fuel ratio of 11.21, cylinder A which receives the fuel of highest inherent antiknock value has the greatest knocking tendency of the three cylinders when 69 to 100 percent of the fuel leaves the manifold in the vapor state. Furthermore, cylinder C which receives fuel having the lowest inherent antiknock value has the least tendency to knock. As the degree of vaporization decreases, the air-fuel ratio of cylinder A decreases from 11.21 toward the maximum knock air-fuel ratio and this change in air-fuel ratio has a greater influence on the knocking tendency of the fuel in the cylinder than the increase in the inherent antiknock value of the fuel fraction itself. Similarly, the richening of the mixture in cylinder C under the same conditions has a greater effect on the knocking tendency of the fuel in this cylinder than the decrease in the inherent antiknock value of the fuel.

The base fuel and conditions illustrated in Figure 6 are those of commercial interest. As a matter of academic interest, and to provide a more complete background for the fuel distribution problem, Figures 7 to 11 have been prepared. Figure 7 is constructed for fuel S.E.G.M. No. 2 illustrated in Figure 6 but at the carburetor air-fuel ratio for maximum knock. A full-throttle setting so lean is not used in cars because of the resultant loss of power at all speeds and uneven operation at low speeds. The carburetor conditions illustrated in Figures 8 and 10 are in the normal range but the fuels for these figures, as well as for Figs. 9 and 11, are specially blended extreme types which are not representative of commercial gasolines.

Fig. 7 is similar to Fig. 6 in all respects except that the carburetor air-fuel ratio is the maximum knock ratio for fuel S.E.G.M. No. 2. At this carburetor setting the air-fuel ratio for cylinder A becomes leaner than that for maximum knock as the degree of fuel vaporization is decreased. Simultaneously the inherent antiknock value of the fuel in the cylinder increases. The result is a marked rate of increase in critical compression ratio as the degree of vaporization decreases.

Under the same conditions, the air-fuel ratio of the mixture in cylinder C becomes richer than that for maximum knock and for this reason the fuel tends to knock less. At the same time however, the inherent antiknock value of the fuel decreases. The result of these two opposed tendencies is that as the degree of vaporization decreases the knocking tendency of cylinder C at first remains close to that of normal cylinder B but becomes less than that for cylinder B as the degree of vaporization is decreased still further.

The differential in antiknock value between the light and heavy ends of fuel S.E.G.M. No. 2 is within the normal range for commercial fuels. Fuel S-11 was specially blended to have light and heavy ends of extremely high and low antiknock value respectively. This abnormal distribution of antiknock value through the fuel fractions reverses the relative knocking tendency of the rich and lean cylinders. Fig. 8 shows for this fuel the relative knocking tendency of the three typical cylinders, A, B and C, when the carburetor air-fuel ratio is 11.46. The difference between the knocking tendency of the light and heavy fractions of this fuel is so great that as the air-fuel ratio of cylinder A moves from 11.46 toward the maximum knock air-fuel ratio, the increase in inherent antiknock value of the fuel in the cylinder almost exactly balances the effect of the change in cylinder air-fuel ratio. At cylinder air-fuel ratios leaner than for maximum knock, both influences tend to decrease knocking and the curve for cylinder A rises rapidly.

As the degree of vaporization is decreased, the knock suppressing effect of the richer mixtures in cylinder C is not sufficient to compensate for the depressing effect of the additional heavy ends of very low antiknock value. Rich cylinder C therefore has the greatest knocking tendency, relative to that of cylinders A and B, when vaporization is between 51 and 100 per cent.

When the carburetor air-fuel ratio is that for maximum knock, the rich cylinder C still has the greatest knocking tendency, relative to cylinders A and B, between vaporization rates of 72 and 100 per cent. Fig. 9 shows however,

*N. P. N., Jan. 26, p. R-34.

that its knocking tendency does not greatly exceed that of the normal cylinder B.

Fig. 10, similar to Figs. 6 to 9, is constructed at a carburetor air-fuel ratio of 11.03 for fuel S-6 which was specially blended to have light and heavy ends of extremely low and high antiknock value respectively. As the rate of fuel vaporization in the manifold is decreased the inherent antiknock value of the fuel in lean cylinder A is decreased and the air-fuel ratio of the mixture moves nearer to that for maximum knock, consequently the knocking tendency increases rapidly. Under the same conditions, as the mixture in rich cylinder C moves farther away from the maximum knock point, the inherent antiknock value of the fuel in the cylinder increases. The two effects combine to cause the knocking tendency of the fuel in cylinder C to diminish rapidly. It should be noted that at 75 per cent vaporization the difference between the critical compression ratios for cylinders A and C is 1.19 ratios, equivalent roughly to 20 octane numbers.

Fig. 11 shows that when the carburetor air-fuel ratio for fuel S-6 is that for maximum knock, the lean cylinder A has a slightly greater tendency to knock than the normal cylinder B when the rate of vaporization is between 90 and 100 per cent but that cylinder B knocks most at lower rates of vaporization. The effect of carburetor air-fuel ratio is quite pronounced for this fuel.

Fuels of commercial interest have a distribution of antiknock value along their distillation curves which lies between but does not approach that for fuels S-6 and S-11. A study of the charts for these two fuels, together with those for fuel S.E.G.M. No. 2, should permit a prediction of the behavior of fuels having various degrees of concentration of antiknock value in the light and heavy ends.

Some mention should perhaps be made of a hypothetical fuel, all of whose fractions have equal inherent antiknock value. The knocking tendency of the fuel in any cylinder would depend only on the air-fuel ratio with respect to that for maximum knock. At the carburetor air-fuel ratio for maximum knock, the normal cylinder B would have the greatest knocking tendency, regardless of the degree of vaporization. At a normal carburetor air-fuel ratio, which would be richer than that for maximum knock, the knocking tendency of cylinder C would decrease with a decrease in the rate of vaporization while cylinder A would knock increasingly more as its air-fuel ratio approached that for maximum knock.

Effect of Adjustment of Choke and Mixture Heat Control Valve

Some form of choke, either manual or automatic, is always installed on the car engine. There is usually also a manual or automatic heat control valve. During the warm-up period in the winter the effect of the choke is to decrease the air-fuel ratio considerably. Under these conditions the degree of vaporization is low and the relative knocking tendency of the several cylinders of the engine may be predicted by a study of Figs. 6, 8 and 10.

After the warm-up period the choke is usually not an important factor in the knocking problem but this is not true of the mixture heat control valve, especially if automatically actuated. As applied to one well known car, the valve by-passes the maximum heat to the intake manifold when the temperature of the air surrounding the manifold is low but applies progressively less as the temperature under the hood rises until, at an air temperature of 75° F. near the thermostat, the valve is entirely closed. The temperature of the air at the thermostat is about 60° F. higher than that of the air outside the hood. If an outside air temperature of 100° F. and a corresponding temperature under the hood of 160° F. are required for complete vaporization, a substantial portion of the fuel leaves the manifold in the liquid state when the mixture heat control valve closes. Vaporization may actually be less when the valve closes than at some lower outside air temperature.

The relative efficiency of heat, in vaporizing the fuel, when applied to the carburetor air and to the mixture through a hot spot immediately becomes of much interest. Fig. 12 shows diagrammatically a modified single cylinder engine intake manifold, together with associated equipment, designed for a study of these effects. The manifold has a long horizontal section and a U-bend, the latter being provided with an opening through which liquid fuel flows to a graduated burette. After flowing downward through the vertical carburetor, the fuel and air mixture is forced to turn a corner. Directly under the carburetor is the electrically heated hot spot against which liquid fuel impinges as it turns the corner.

A section of the manifold is surrounded by a jacket through which water of varying temperature may be circulated for heating of the mixture. Air for the carburetor is supplied by an air conditioner which is capable of delivering air having a range of temperature and humidity.

Fig. 13 shows for one commercial gasoline the relation between temperature of the mixture entering the cylinder and the degree of fuel vaporization when the heat is supplied alternately to the carburetor air and to the hot spot. Between the limits of no heat applied to the hot spot and complete vaporization of the fuel by either method of heating, the mixture at any temperature leaving the manifold contains a greater fraction of the fuel delivered by the carburetor when the heating is done by the hot spot. For example, at a final mixture temperature of 85° F., 88 per cent of the fuel passes into the cylinder with the air when the carburetor air is heated but the quantity increases to 94 per cent when the heat is applied by the hot spot. Similarly, complete vaporization of the fuel is accomplished at a lower mixture temperature in the case of hot spot heating.

Variations in Ignition Timing from Cylinder to Cylinder

THE relative knocking tendency of the cylinders of a multicylinder engine varies with carburetion and fuel distribution, as illustrated in Figs. 6 to 11, provided that spark advance and cylinder cooling are uniform. Because of the longer cylinder jackets and better direction of flow of cooling water in recently built car engines, it is believed that variations in knocking among the cylinders due to differences in cooling have in general been minimized. Variations in spark advance appear to create a greater problem. For example, the leanest cylinder may have the greatest knocking tendency because of partial fuel vaporization and imperfect distribution, as illustrated in Fig. 6. If, however, the spark advance in this cylinder during knocking is retarded relatively to that in the other cylinders, the most pronounced knock may occur in some other cylinder. In any study of the effects of fuel distribution it is desirable therefore to be able to measure the ignition advance in each cylinder simultaneously.

Fig. 14 shows a recently developed instrument for this purpose. A drum weighing 20 pounds and designed to hold a strip of 35 m.m. cinema film on its outside surface is driven at a constant speed of 75 r.p.m. by a 6-volt electric motor. A neon tube is enclosed in a small light-tight box which is quite close to the drum. A narrow slot in the box, parallel to the axis of the film drum, permits the flash of the neon tube to appear as a line on the film, perpendicular to its length. The tube lights as a result of the voltage induced by the breaking of the primary circuit of the ignition system and by the motion of two flywheel studs, 180 degrees apart, past a magnetic pickup mounted on the flywheel housing. The pickup is similar in design to that employed by the Chrysler Corporation in its instrument for the measurement of mean spark advance in the cylinders. The induced voltage is amplified by the triode section of a dup'ex diodetriode vacuum tube (Type 6R-7) and the amplified output is coupled to the grid of a power tube (Type 6A-3). The neon tube is connected in parallel with the load resistance of the power tube. It is lighted when the voltage across the load resistance of the power tube rises to approximately 90 volts and is extinguished when the voltage applied to the grid of the power tube decreases due to termination of the signal impulse.

The oscillatory impulse from the primary of the ignition coil due to the opening of the breaker points is rectified and amplified in the Type 6R-7 tube and applied to the grid of the power tube, producing a flash of the neon tube and a mark on the film for the firing of each

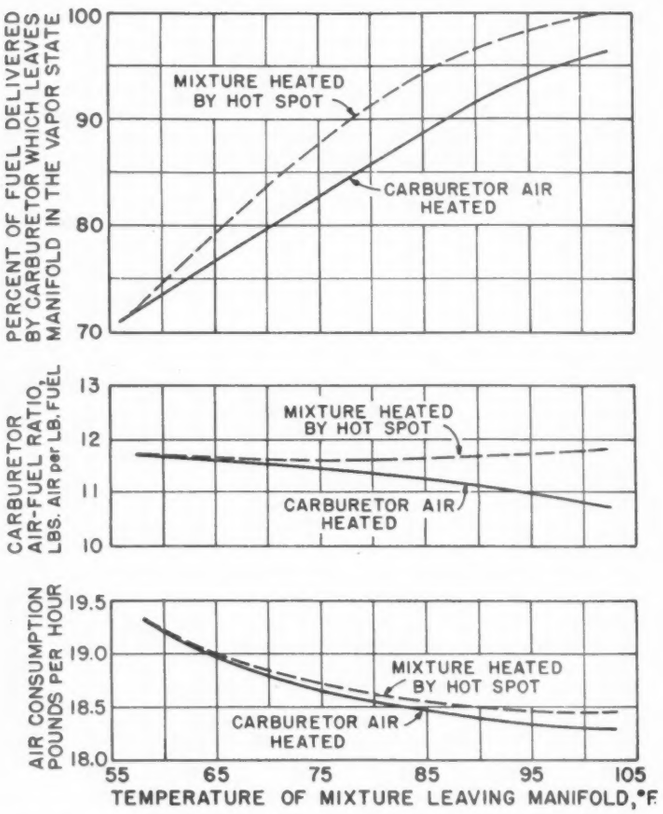

Fig. 13. Effect of hot spot mixture heating and carburetor air heating on the vaporization of fuel in the manifold. The series 30B engine with manifold and associated equipment in Fig. 12 is used with a fixed carburetor setting and 900 r.p.m. engine speed

cylinder. A portion of the high voltage impulse to No. 1 spark plug is amplified and applied to the grid of the power tube, resulting in a flash of longer duration which identifies the film mark for No. 1 cylinder. One revolution of the film drum covers a number of complete engine cycles. A ratchet type relay limits the exposure to one revolution of the film drum.

Ignition timing of the individual cylinders is read from a curve of angular displacement of the crankshaft versus time, obtained from the flywheel reference points.

Determination of Knocking Tendency of Individual Cylinders

The knocking tendency of the individual cylinders of a car engine may be determined by the aid of the auxiliary breaker used with the gas sampling valve as shown in Fig. 2. When the knocking of No. 1 cylinder is to be measured, the regular distributor is retarded and the auxiliary breaker is set to produce a timing in No. 1 cylinder which is the same as that given by the regular distributor when properly adjusted. After the knocking tendency of No. 1 cylinder has been measured, the auxiliary breaker is used to produce the correct ignition timing in cylinder No. 2, and so on for the remainder of the cylinders. Since the auxiliary breaker is mounted on the same shaft as the regular breaker, it duplicates the advance characteristics of the regular breaker.

Reference Fuels

The scale of ordinates for Figs. 6 to 11 is critical compression ratio. For some purposes it may be desirable to substitute an octane number scale but many such scales are possible, depending on the choice of reference fuels and the conditions under which they are tested. For example, either the primary or secondary reference fuels might be used. They might be run always at the maximum knock air-fuel ratio or at the same carburetor setting as for the fuel under test. A blend of the secondary reference fuels equal to a given blend of the primary reference fuels at the maximum knock air-fuel ratio may be far from equal to another air-fuel ratio.

The reference fuels may be run under conditions of complete vaporization or under the manifold conditions employed for the fuels under test. In the usual tests of commercial gasolines, only a small fraction of the primary reference fuels fails to vaporize, even when the rate of vaporization of the test fuels is low. Under the same conditions, a much larger fraction of the secondary reference fuel blends remains in the liquid state and the unvaporized portion is composed largely of fuel A-5. The equivalent octane numbers of single points on the curves of Figs. 6 to 11 may vary as much as 15 octane numbers, depending on the choice and method of testing of the reference fuels. Curves of octane number versus per cent of vaporization may have shapes entirely different from the corresponding curves of critical compression ratio versus per cent of vaporization.

There is every reason to believe that the complication introduced into the interpretation of laboratory octane numbers obtained under conditions of partial fuel vaporization enters also into the determination of road octane numbers. Regular grade gasolines require the use of the C-10 and A-5 reference fuels. As the per cent of the A-5 component in the blend is increased, the fraction of the blend which is vaporized in the manifold should decrease, causing the leanest cylinder to become leaner and the richest cylinder richer. The cylinder which knocks most on the test fuel may not knock most on the reference fuel blend and the cylinder which knocks most on a blend containing a high per cent of C-10 may not knock most when the per cent of C-10 is reduced.

If the volatility of the two secondary reference fuels were interchanged, the knocking tendency of a given percentage blend under any condition of imperfect distribu-

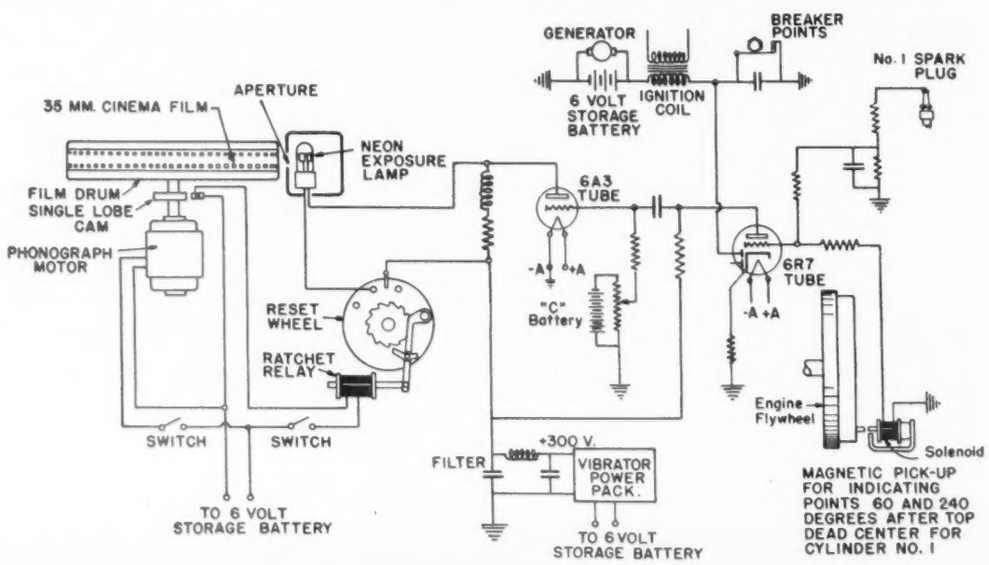

Fig. 14. Details of instrument for recording on cinema film the ignition timing in individual cylinders of a multicylinder engine

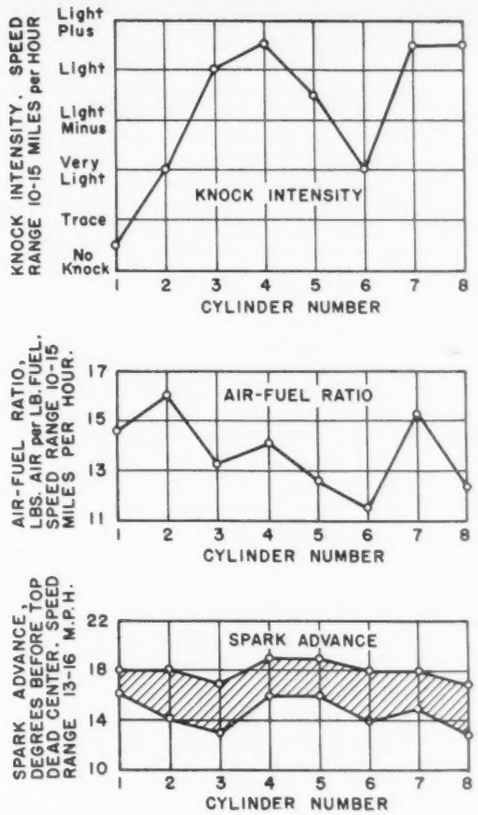

Fig. 15. Variation of air-fuel ratio, spark advance, and knock intensity among the cylinders of an automobile engine in the speed range of maximum knocking

tion obviously might be markedly different. An increase in the concentration of A-5 in the blend would then *increase* the vaporization in the manifold with a resultant *decrease* in the inherent antiknock value of the vaporized portion. Such effects introduced into the road knock testing procedure by the difference in volatility of the reference fuels appear in the road ratings of the test fuels as apparent appreciation or depreciation of these fuels with respect to the laboratory ratings.

Once the observation is made that road octane numbers determined under conditions of imperfect manifold vaporization and fuel distribution are influenced by the choice of secondary reference fuels, a consideration of desirable characteristics of secondary reference fuels assumes real importance. In the light of the previous discussion it appears that from the standpoint of minimizing the complications introduced into road knock testing by the secondary reference fuels, such fuels ideally should have the following characteristics:

1. The distillation curve of the fuel of high antiknock value should match exactly that of the fuel of low antiknock value in order to provide constant vaporization in the manifold as the proportions of the two fuels in the blend are changed.
2. The volatility of the reference fuels should approximate that of the average commercial gasoline, thereby insuring, insofar as possible, the same cylinder air-fuel ratios for the test and reference fuels.
3. All fractions of each fuel should have equal antiknock value in order to prevent a change in the inherent antiknock value of the vaporized portion of the blend in the manifold as the degree of vaporization is changed. Inasmuch as commercial gasolines have light ends whose antiknock value is higher or lower than or equal to that of the heavy ends, the distribution of antiknock value in the reference fuel blends would then approximate that of the average of fuels met in service.

These specifications constitute a large order which will probably never be filled. It should however be possible to produce secondary reference fuels which, for use under conditions of partial vaporization, are an improvement over the present A-5 and C-10 fuels. The latter are entirely satisfactory for use in the laboratory in conjunction with the standard C.F.R. engine manifold and were almost equally suitable for road test purposes until the fuel distribution problem attained its present importance. It should be noted that the primary reference fuels substantially fulfill the first and third of the above-described specifications.

Correlation of Road and Laboratory Knock Ratings

The correlation of laboratory with road knock ratings creates two distinct and basically different problems, viz:

1. Reproducing on the laboratory engine the conditions of operation of a single car engine in a single test.
2. Determining a laboratory procedure which gives ratings that agree insofar as possible with the averages of ratings obtained in a group of cars under one or more conditions of test.

The first is by far the more simple. If every variable of engine operation such as mixture and cylinder temperatures, spark advance, speed, fuel composition and mixture ratio, applicable to the knocking cylinders of the multicylinder engine is duplicated on the laboratory engine, the ratings of all types of fuels should be duplicated, provided of course that the same reference fuels are used in both cases.

If partial fuel vaporization in the intake manifold of the car engine gives rise to differential distribution of unvaporized liquid fuel which in turn causes a cylinder richer or leaner than the normal cylinder to have the greatest knocking tendency, the knock ratings in the car engine of a wide variety of fuels can not be duplicated on the laboratory engine unless provision is made for the simulation of the mixture distribution of the multicylinder engine by some means such as that described herein. A fortuitous compensation for the effects of mixture distribution may be made for a limited number of fuels by changes in other engine variables but such an arrangement is almost certain to fail when applied to a large group of fuels.

A modification of the conventional laboratory knock testing procedure by the substitution of a manifold designed to simulate the action of the intake manifold of the car under consideration should go a long way toward explaining the anomalous behavior of fuels observed from time to time in a single car.

Before an attempt is made to duplicate on the laboratory engine the ratings obtained on a given car, it is believed advisable to construct a chart similar to Fig. 15 in which air-fuel ratio, spark advance and cylinder knock intensity are plotted against cylinder number. Such a chart not only indicates the cylinder of greatest knocking tendency and its air-fuel ratio, but furnishes the data required for the computation of average air-fuel ratio and the degree of vaporization. The information on ignition timing may serve to explain the greatest knocking tendency of one cylinder when under conditions of uniform ignition timing the laboratory engine indicates that a cylinder having a different mixture condition should knock most.

The second problem, that of finding a set of operating conditions for the laboratory engine which gives ratings that agree with the average of ratings in a group of cars, is quite different. The average road ratings reflect the results of the simultaneous operation of a host of variables combined differently in each car. Considering alone those variables which arise through variations in carburetion and fuel distribution in the engine, it is obvious that a fuel might be rated in one car under conditions of substantially perfect distribution and at an air-fuel ratio near that for maximum knock while in another car distribution might be equally good but the air-fuel ratio in all cylinders might be considerably richer than that for maximum knock. In a third car with imperfect fuel distribution the rating might be determined by the behavior of the portion of the fuel leaving the manifold in the vapor state and burned at the air-fuel ratio for maximum knock. The list of possibilities is far from exhausted when it becomes apparent that no single set of carburetor and manifold conditions for the laboratory engine theoretically should give ratings equal to the average of ratings obtained on several cars having a wide variation in carburetion and manifold conditions.

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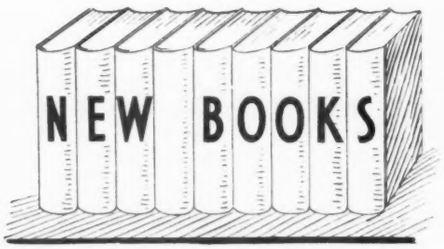
effects of non-uniform fuel distribution are now apparent in any fuel knock rating data obtained on a group of cars. One of the most impressive demonstrations of the importance of this variable was furnished by a series of road tests in which the 12 test fuels were specially blended to have an extreme concentration of antiknock value in different portions of the distillation range. Fuels S-6 and S-11, previously mentioned, were two of the test fuels.

After the effects of imperfect fuel distribution within the engine have been found to exist, the problem of most immediate interest is the development of some means for the correction of variations in the road ratings of fuels, rated as equal by present laboratory methods, due to this variable. The British have for some time used a correction factor for benzol blends. For the first 30 per cent total aromatics in any gasoline, one octane number is added to the conventional laboratory rating and for each additional 15 per cent aromatics another octane number is added. A correction factor applicable to all types of fuels and capable of direct determination on the engine would be desirable.



Asphalt Reference Work

Newly published is the fourth edition of "Asphalts and Allied Substances," a book aimed to include every known fact about bituminous substances. The book is a reference work on the chemistry and technology of bituminous substances and includes methods of testing and analysis of asphalts, tars and pitches as well as descriptions of manufactured products. Author is Herbert Abraham, president of The Ruberoid Co.

Industrial and technological processes using these materials in the production of pavements, roofings, floor coverings, waterproofings, molded compositions, lacquers, etc., are described step by step. Recent developments are included among these processes.

A feature of the new edition is a section of over 250 pages embracing a bibliography of 900 treatises and references to more than 9000 patents and 3000 articles in general literature. Publishers claim every detail, every method, and every process for the production, utilization, and testing of all asphalts, tar, pitches and derived products is included in this reference work.

The book contains over 1500 pages, which is 67% larger than the previous edition, and is bound in semiflexible fabrikoid. Page size is 6¼ x 9½ inches. The book may be obtained from the Book Department of NATIONAL PETROLEUM NEWS. Price is $12.50.

* * *

Welding Handbook

The fifth edition of the "Procedure Handbook of Arc Welding Design and Practice," containing 1012 pages and 1243 illustrations, is announced by The Lincoln Electric Co., Cleveland. The handbook is reissued each year to include all new data essential for most efficient use of arc welding in all its varied applications.

The book is written especially for use of designers, engineers, production managers, welding supervisors and operators and contains data of interest to draftsman, steel fabricators and erectors, cost estimators, maintenance managers, and piping and pipeline contractors.

Copies will be mailed, post paid, to any point in the United States for $1.50 and to foreign addresses for $2.

Activities OF EQUIPMENT MANUFACTURERS

CLARIFIER — Settling problems in connection with water, chemicals, solutions or mixtures are handled in a new manner by the Seip Multi-tray Clarifier. The settler is newly designed and built on a new principle, that of upward sludge filtration by means of periphery intake channel.

The apparatus consists of one, two or as many as seven round, inverted trays within a tank shell. The space within each tray forms a settling chamber. If the solution to be clarified is thick and has solids in suspension, these solids collect on the top of each tray (which acts as a bottom for the settling chamber above it) and function as an entangling medium for light-weight particles which would not otherwise quickly settle. Movable scrapers operated from a central shaft remove surplus sludge. The intake of this settler is said to be ten times as large as the average. This reduces the rate of flow and results in minimum disturbance of the liquid. Graver Tank & Mfg. Co., Inc., East Chicago, Ind., is the manufacturer.

* * *

FLOW CONTROL MOVIE—How valves and fittings give mankind control over liquids and gases is visualized in a sound picture entitled "Flow" just released by Crane Co., 836 S. Michigan Ave., Chicago. Scenes of rivers in flood, thundering waterfalls and then primitive means of controlling flow are followed in the picture by an educational tour through the Chicago works of Crane Co., where the various steps in manufacturing with iron, brass and steel are revealed.

* * *

DIESEL ENGINES—Maximum and rated performance curves of the seven current sizes of Caterpillar diesel engines are included in a new 32-page booklet (Form 4253) issued by Caterpillar Tractor Co., Peoria, Ill. Printed in three colors, the attractive book is a brief resume of these engines, features, both mechanical and materials of construction. Explanatory cutaways illustrate the engine's working parts. Copies are obtainable on request.

* * *

COMPRESSORS—Developments and refinements accomplished in 30 years of manufacturing direct-connected synchronous-motor-driven compressors, are presented in a new 56-page catalog (No. 3426) covering class "PRE" compressors, issued recently by Ingersoll-Rand Co., 11 Broadway, New York. This type is a horizontal, duplex, double-acting, crosshead compressor, built to run at moderate speeds for continuous heavy-duty service. Sizes range from 200 to 300 hp. for single and multi-stage compression of air or gas to discharge pressures up to 5000 pounds per square inch.

One of the features of the new catalog is a two-page chart devoted to the interrelation of design and service operation. More than 50 installations are illustrated on 20 pages of the catalog.

* * *

GATE VALVE — A new Fairbanks U-Bolt gate valve is announced by The Fairbanks Co. Binghamton, N. Y. One of its unusual features is relief slots which permits drainage back into the body chamber and eliminate the possibility of freezing or clogging above bonnet threads. A U-bolt locks the body and bonnet together. The valve is designed for 150 pounds steam working pressure and 225 pounds gas and liquid pressure. Sizes are from ½ inch to 4 inches.

* * *

J. H. Mitchell-Roberts, export manager for Oliver United Filters Inc., left Manila Jan. 14 for Melbourne, Australia, where he will spend several months with the company's agent, Crossle & Duff Pty., Ltd. Mr. Roberts has been in the Philippines and vicinity since early in 1937.

PYROMETER CATALOG — A new 28-page pyrometer catalog (No. 1101D) has just been published by C. J. Tagliabue Mfg. Co., Park and Nostrand avenues, Brooklyn. The book describes and illustrates features of Tag Celectray pyrometers and resistance thermometers which utilize a phototube, mirror galvanometer and a beam of light.

* * *

BLOW-OFF VALVE — The first bulletin describing Hancock's new blow-off valve with "Blo-Deflector" protecting lip is just off the press and will be of interest wherever such a valve is required. The protecting lip is said to "outsmart wear and resultant leakage". Additional protection is afforded by fusing Stellite to the face of the seat ring. The design is simple and is said to be easy to operate. Hancock Valve Division of Manning, Maxwell and Moore, Inc., Bridgeport, Conn., is manufacturer.

* * *

CELEBRATES 30TH ANNIVERSARY—Oliver United Filters Inc. celebrated its 30 years in the filtration business with a supper-dance Jan. 10, at Hotel Leamington, Oakland, Cal. Most of the company's 400 employes were present to give special recognition to the 109 who have been with the company 10 or more years. Representatives from the New York, Chicago and San Francisco sales offices, as well as from the Hazleton, Pa., and Oakland factories, were present. President E. L. Oliver and Chairman E. J. Sweetland and other executives of the company spoke.

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Kellogg Co., M. W. R-43
Koppers Co. .....
Lummus Co. .....
Merco Nordstrom Valve Co. .....
Perco, Inc. .....
Petroleum Engineering, Inc. .....
Petroleum Rectifying Co. of Calif. .....
Polymerization Process Corp. .....
Shand & Jurs Co. .....
Sharples Specialty Co. .....
Sonneborn Sons, Inc., L. .....
Sun Shipbuilding & Dry Dock Co. R-57
Texaco Development Corp. .....
Universal Oil Products Co. 27

Patent Literature of Today

Clay reactivation, No. 2 102 341, *issued Dec.* 14, 1937, *filed April* 15, 1936; *G. H. von Fuchs, assignor to Shell Development Co.; one drawing,* 8 *claims.*

Spent clay is reactivated with a mixture comprising a predominating amount of benzene and a smaller but substantial amount of ethyl alcohol in the presence of sufficient ammonia to displace the adsorbed matter from the clay. The method is particularly applicable to acidic adsorbents, obviates subsequent acid treatment, and is said to be as efficient as extraction with an alcoholic solution of caustic. The elimination of this after-treatment lowers the cost of the process and avoids rapid corrosion of the older method.

* * *

Cracking. No. 2 102 269, *issued, Dec.* 14, 1937; *filed Feb.* 26, 1930; *L. C. Huff, assignor to Universal Oil Products Co.;* 2 *drawings;* 5 *claims.*

A liquid-vapor-phase system is provided wherein the pressure distillate vapors are further fractionated in a secondary fractionating tower within the system and the reflux, corresponding to pressure distillate bottoms, from this secondary fractionating tower is reconverted under vapor phase cracking conditions.

An outstanding feature is the optional use of a residuum revaporizing or flash distilling system wherein the residual products from both the liquid-vapor-phase and vapor-phase systems may be released under reduced pressure and their combined redistillation thereby effected.

The process also provides for the use of reflux from the deflegmator of the flash system, consisting of reflux condensate combined with preheated and topped raw oil charging stock, as a cooling medium in the vapor-phase dephlegmator or in the liquid-phase dephlegmator, or in both. Return of reflux from the dephlegmator of the vapor-phase system to the liquid-phase heating element and its reconversion therein is provided.

* * *

Polymerization. No. 2 101 857, *issued Dec.* 14, 1937; *filed April* 23, 1936; *V. Ipatieff and R. E. Schaad, assignors to Universal Products Co.; no drawing;* 16 *claims.*

A mixture of hydrocarbons containing three and four carbon atom olefins is subjected to three successive stages of polymerization in the presence of solid phosphoric acid catalyst. The first stage is at 70-150° F. to polymerize isobutene; the second stage is at 150-250° F. to polymerize the n-butenes; and the third stage is at 250-500° F. to polymerize propylene.

The catalyst is made by mixing an acid of phosphorus with unreactive siliceous adsorbent until a paste is obtained, this paste being then calcined to produce a solid cake which is ground and sized to produce catalyst granules. A feature of the invention is the use of ordinarily liquid phosphoric acids as polymerizing catalyst in substantially solid form.

See also patents Nos. 2 102 073-4. The latter provides for preliminary treatment of olefin-containing gas mixtures with solid contact materials comprising orthophosphoric acid and thereafter to solid contact materials comprising pyrophosphoric acid.

* * *

Decomposition products. No. 2 102 654, *issued Dec.* 21, 1937; *filed Jan.* 26, 1934; *R. D. Snow, assignor to Phillips Petroleum Co.; no drawing;* 21 *claims.*

Chemical compounds are produced by reacting olefin-sulfur dioxide complexes with alkaline substances and to the products resulting therefrom. Organic acid products and/or their salts, neutral oily products and organic decomposition products are produced by means of reacting olefin-sulfur dioxide complexes with aqueous or alcoholic alkali or alkaline earth hydroxide solutions, ammonium hydroxide solutions, ammonium hydroxide, liquid ammonia, and amines or other substituted ammonia compounds.

* * *

Treatment. No. 2 102 796, *issued Dec.* 21, 1937; *filed April* 15, 1936; *J. Happel and D. W. Robertson, assignors to Socony-Vacuum Oil Co.; one drawing;* 8 *claims.*

Sour distillates are treated without the use of aqueous alkaline solutions. The first step is to admix the oil with a gas containing free oxygen and with elemental sulfur, then pass it through a filter bed consisting of a metallic sulfide insoluble in water supported by a porous, inert carrier. This preliminary treatment is said to increase the effectiveness of the sodium plumbite process.

* * *

Polymerization. No. 2 102 927, *issued Dec.* 21, 1937; *filed June* 22, 1934; *H. Tropsch, assignor to Universal Oil Products Co.; one drawing;* 2 *claims.*

Gasoline is produced from olefin containing gas mixtures by a succession of co-operative steps involving both polymerization and pyrolysis. Gas mixtures are first contacted with solid phosphoric acid catalysts to polymerize the olefinic constituents. Liquid polymers are cooled and separated. Residual gases are recracked to produce further quantities of polymerizable olefins which are returned to the polymerizing step.

* * *

Ketene polymers. No. 2 103 505, *issued Dec.* 28, 1937; *filed April* 17, 1934; *P. J. Wiezevich and A. H. Gleason, assignors to Standard Oil Development Co.; no drawing;* 7 *claims.*

Esters are prepared by reacting aliphatic poly-hydroxy alcohols with the products obtained by the polymerization of ketene in the presence of an acid esterification catalyst. Aceto-acetic esters are prepared by contacting cyclobutane 1:3 dione with an aliphatic poly-hydroxy alcohol in the presence of the acid esterification catalyst.

* * *

Cracking. No. 2 103 561, *issued Dec.* 28, 1937; *filed Aug.* 23, 1932; *H. A. Smith, assignor to The Texas Co.; one drawing;* 4 *claims.*

Heavy oil is subjected to mild cracking conditions in the liquid phase and cracked products separated into vapors and liquid residue. The vapors are sent to a partial condensing zone where heavier fractions are condensed. A portion of the condensate so formed is introduced into an upper point in a separate reaction zone and the liquid residue is also introduced to this zone.

Hot vapors are then introduced to maintain a cracking temperature. Cracked vapors are removed to a dephlegmating zone where clean condensate and a vapor fraction of the desired boiling characteristics are separated. Another portion of the first mentioned condensate is introduced into the dephelegmating zone where uncondensed vapors are removed from the partial condensing zone. Removed vapors are condensed and condensate so formed is heated in mixture with clean condensate and a portion of the first mentioned condensate to a vapor phase cracking temperature. Hot cracked vapors are formed and unvaporized residue is withdrawn from the reaction zone at such a rate as to prevent the accumulation of large amounts of liquid therein.

OIL and HIGHWAYS

National Roadbuilders' Show Demonstrates the Important Part Oil is Playing in Modern Highway Construction

CLEVELAND OIL COMPANY salesmen who manned the petroleum exhibits and shook hands with road contractors at the 35th annual road builders show here Jan. 17-21 sold an indefinite amount of oils and greases to lubricate road scrapers, tractors, steam shovels and trucks.

At least seven oil companies invested $1.50 a square foot to be among the 225 exhibitors at the American Road Builders Association convention.

However important road builders may be as lubrication customers, the oil industry had an equally vital interest in the technical discussions which were the backbone of the show. Since some $800,000,000 was raised in 1937 by gasoline taxes, the oil industry is in the position of being a financial guardian, or means of support, to a rapidly growing child—road building. Thus every oil company, jobber or dealer in the country had an interest in the road builders who met here to discuss ways and means of building better roads at less cost.

The cheapest of all hard surfaced roads was shown to be bituminous asphalt, derived from a by-product of refinery stills.

Thus, with asphalt roads meaning both lower tax costs and more sales to the industry, it is not surprising that the Asphalt Institute presented a paper on asphalt paving, kept an eagle eye on proceedings, and Standard Oil Co. (Ohio), for example, devoted its exhibit space to extolling the virtues of asphalt paving, and six other oil companies exhibited.

Increased Use of Asphalt

The road builders who convened here reported considerable trend toward lower cost surfaces already during 1937. The trend is particularly noticeable in highways completed on state systems in 1935, 1936 and 1937. The high-cost type surfaces, according to a survey of the Western Petroleum Refiners Association, which surfaces represent an expenditure of $25,000 to $50,000 a mile, dropped from 17.5 per cent of the total surfaced highways constructed in 1935 to less than 15 per cent of the total in 1937.

At the same time the lower cost bituminous or asphaltic surfaces, ranging in cost from $5,000 or less a mile to $20,000 a mile, increased from 82.5 per cent of the total surfaced highways constructed in 1935 to more than 85 per cent of the total constructed in 1937, the W. P. R. A. reported.

The above diesel tractor, working at Signal Hill, Calif., used 14 gallons of fuel oil per 8-hour day. This tractor and two men recently from a Tuesday morning to the following Friday afternoon ripped up Junipero Avenue for one-half mile, disked, rolled top dirt over with grader, mixed with oil, and respread for traffic

(*The* 1937 *consumption of asphalt for all purposes was approximately* 4,220,000 *short tons, according to preliminary estimates. This is considerably in excess of one billion gallons.*)

Because of the lowered average cost, state highway departments, with the assistance of the Federal Bureau of Public Roads, were able to construct 17,135 miles of surfaced highway in 1936 compared with only 13,059 in 1935. In the fiscal year 1937, 18,768 miles were completed, establishing a new record as costs per mile continued their downward trend.

Low Maintenance Cost

Exhaustive maintenance cost studies by the City of Minneapolis, it was brought out at the road show, reveal that bituminous surfaced streets, some of them constructed in 1898, have been maintained for $31.25 per mile of 18-foot width surface. Maintenance cost for concrete streets in Minneapolis has averaged $143 per mile per year, it was said.

Reports of highway departments in such states as Florida, New York, Rhode Island, Nevada and Wyoming show consistently lower maintenance costs for asphaltic surfaces than for the more expensive surfaces.

Florida, for example, reported an annual maintenance cost of $12.51 a mile on its bituminous concrete surfaces compared with $36.31 a mile on its cement concrete surfaces, according to data compiled by the W. P. R. A. Similar maintenance economies were reported by other states.

OHIO has had more experience with asphaltic paving than probably any state in the union.

The Ohio legislature, containing a powerful rural bloc, has pursued a policy of building many hard surfaced roads from small town to county seat, rather than concentrating on building wide cross-state highways. Thus in Ohio today there is hardly a superhighway, except for sections of federal highways, but one can travel in every direction off the main routes and seldom strike any but a paved road.

Ohio ranks third among the 48 states

in highway mileage, fourth in motor vehicle registration, but only eleventh in expenditures.

In endeavoring to spread the funds available as far as possible over the entire system and in the building up of Ohio's mileage of hard surfaced road (18,000 miles Jan. 1, 1938), it is naturally over a period of time necessary to build these roads narrow and of as economical a type of construction as possible. By law the Ohio director of highways must maintain every mile of this large mileage.

How Ohio had been able to fulfil this maintenance task and build up to the rank of third in mileage with an expenditure ranking eleventh, was told in a large wall exhibit at the road show of Standard Oil Co. (Ohio).

In 1937, Philip C. Doyle, sales engineer for Sohio, explained, Ohio spent $5,020,579 to widen and resurface *with asphalt* 380 miles of road. If Ohio had used expensive non-flexible types, mileage widened and repaved would have been only 183 miles with the same amount of money. This information was displayed on the wall exhibit where 25,000 state highway officials, contractors and others at the show could examine it.

A second big economy results from the use of asphalt, road showmen were informed, because it is possible to salvage the old road foundations. For safety, present traffic demands at least a width on roads of 20 feet. In 1936 Ohio adopted a plan to concentrate on widening its state road system to a minimum road width of 20 feet and to reduce temporarily its building of new roads. This plan salvaged the investment (Ohio state highway engineers' estimate of investment is $14,000 per mile) already in the road and at the same time afforded a new smooth riding surface at a comparatitvely low cost, Mr. Doyle said.

Were any other policy than that of the state adopted, this investment would have been entirely lost. In past years it was customary to dig out these foundations and build entirely new non-asphaltic roads. During 1937, however, the Ohio department widened these foundations with asphaltic stone base and resurfaced the entire road.

The 1936 mileage, motor vehicle registration and highway expenditures of the first 11 states are given in Table I.

● The oil industry has varied interests in the highway program of this country.

For one thing, it collected around $1,000,000,000 in state and federal taxes on gasoline and lubricating oil in 1937 from taxpayers who believe this money is used for highway improvement.

The marketing branch of the oil industry sells its products principally through stores located on these highways, so it is vitally interested in the road building programs of the future, even down to the owner or operator of a single station on the highway.

The oil industry also manufactures a product which is being used in increasing volume in road building. The advantages in lower building and upkeep costs of asphalt roads are becoming widely recognized.

So, when 25,000 road contractors, highway engineers, equipment manufacturers and so on, with oil company representatives among them, gathered for a week in Cleveland at the annual American Road Builders Association Show, a NATIONAL PETROLEUM NEWS staff writer attended the proceedings, studied the exhibits and his compilation of facts of interest to oil men is contained in the accompanying article.

Safety of Asphalt

Safety of asphaltic surfaces (rough) compared with other pavements was also depicted for road show visitors at Sohio's exhibit. In gathering data for the safety graph, and to simulate as near as possible what would actually happen to a motorist in driving his car over these pavements, an 8 cylinder 1937 Buick was equipped with smooth tires. A hydraulic line running to the brakes was tapped and a pressure gauge installed on this line and the brake pressure adjusted to 300 pounds on a dry surface. The skidding distances were measured, beginning the skid at 30 miles per hour.

An average of these tests show that the car skidded 25 feet on asphaltic concrete, 37 feet ten inches on type B pavement and 57 feet on type C. These latter two were non-flexible pavement, such as concrete and brick.

Oil Company Research

Speaking before the National Asphalt Conference in Memphis, Tenn., Dec. 6-10, Thomas H. MacDonald, chief of the U. S. Bureau of Public Roads, called for increased support by the petroleum industry for research work, which he said is now needed on the properties and uses of asphaltic materials.

Such research is highly technical, but Sohio placed on exhibit equipment used in determining the best possible formula for asphaltic road mixes. Contrary to a popular belief, Mr. Doyle said that a road made of a mix with the proper amount of asphaltic content would last 30 years—as an estimate, while the average road today has a life of 14 years.

Equipment at Road Show

NO MATTER how good or how cheap the material, the practical road contractor takes into consideration the type of machinery available to lay the road. Consequently, W. R. Macatee of Cincinnati, district engineer for the Asphalt Institute, scanned the exhibits closely for new machinery facilitating the use of asphalt as a road material.

Here's what he found, among other new equipment:

A traveling unit capable of constructing asphaltic surfaces in six-inch depths, an unusually deep depth.

To eliminate the clumsiness of road mixing plants has been a constant goal of asphaltic equipment designers. Macatee reported "Of equal importance was the great interest shown in mobile types of hot-mix plants. High speed of erecting, dismantling and transporting them is a feature."

A trencher noted as a highly mobile piece of equipment mounted on a light truck for widening existing roads. It cuts—in one pass—trenches parallel to old pavements in widths up to 48 inches and 12-inch depths. It cleanly cuts trenches, the outer side walls of which being used in lieu of side forms. This effects savings in form-setting operations otherwise required.

A trench roller was pointed out as

TABLE I

Highway Expenditures in Leading States

	1936 Mileage State Highway	1936 Total Motor Vehicles	1936 Funds Expended by State Highways 11 Mos. and by U. S. Bureau of Roads
1—Pennsylvania	38,032	1,918,116	$81,954,000
2—New York	13,907	2,453,542	68,239,000
3—California	12,823	2,327,984	58,668,000
4—Texas	20,955	1,478,124	49,732,000
5—Illinois	17,489	1,659,750	49,035,000
6—Michigan	9,880	1,373,675	40,885,000
7—Wisconsin	10,011	835,178	40,369,000
8—New Jersey	1,886	943,412	37,928,000
9—Massachusetts	1,887	816,711	35,476,000
10—Missouri	17,193	809,615	35,316,000
11—Ohio	17,676	1,777,048	32,895,000

Even when gasoline stocks are too high and prices are too low, Dubbscracked gasoline goes to market while ordinary gasoline goes to storage and stays there—till the banker pulls the plug

Universal Oil Products Co
Chicago, Illinois

Dubbs Cracking Process
Owner and Licensor

having a narrow width of roller, but having the same compression as larger units. It is designed for placing asphaltic mixtures for road bases in narrow widths.

A 1000-gallon asphalt distributor attracted attention because of its motor with transmission, giving two forward pump speeds and a reverse for pumping asphalt back into tank cars, if desirable. The distributor may be operated by one man, rather than the customary two, because the driving control as well as the control of the distributor bar is located at the rear end.

An asphalt surfacing drag featured by small, half diamond shaped movable mixing plows which operate in vertical slots. This reduces to a minimum segregation of the several sizes of material in road mixes, and is said to thoroughly mix aggregates with liquid asphalt in one operation.

America, Now Out of the Mud, Must Build Safer Highways

"WE HAVE taken America out of the mud,

Now we must make the highway safe for America."

If the accomplishments and aims of the 25,000 road contractors, government highway officials, equipment manufacturers and engineers attending the 1938 American Road Builders Association show here were reduced to a slogan the above remark would be it.

"We have taken America out of the mud, now we must make the highway safe for America" was adopted from a paper presented at the road show by C. H. Purcell, president of the American Association of State Highway Officials.

What kind of highways will the road builders build to improve their safety? What will the highway of tomorrow be like?

The highway of tomorrow is not a dream in the minds of road builders, but embodies a number of definite improvements over the highway of today. The improvements summarized by Harold F. Hammond of New York, chairman director of the traffic division of the National Conservation Bureau, were as follows:

Careful planning of alignment, profile and intersections.

Wider bridges, culverts and underpasses.

Greater use of non-skid surfaces.

Wider lanes—11 to 12 feet.

Special treatment of physical obstructions on or near roadway.

Medial strips (center islands).

Slanting curbs on medial strips.

Highway lighting.

Pedestrian sidewalks and paths.

Wider shoulders and special turnout areas.

Proper guard rails.

Adoption and use of uniform traffic control devices.

Treated shoulders.

These improvements mean that there will be no blind spots in the highways of the future; that highways will be wider; there will be turn-outs for school buses; traffic traveling in opposite directions will be separated by grass plots; that intersections will be reduced to a minimum or eliminated by upper and lower levels and connecting ramps, and that there will be different lanes for slow and fast-moving traffic or separate parallel roads provided for them.

Highway Lighting Is Pet Project Of American Road Builders

SAFER highways means more road building and, excepting individual state reports, more papers were presented on highway safety than any other single subject at the American Road Builders Association show here Jan. 17-21.

While many types of improvements would contribute to greater highway safety, covered elsewhere in this issue, the pet project of the road builders is highway illumination—the money for which would presumably come from gasoline tax funds.

The special interest in highway illumination is accounted for in the statement of R. W. Crum, director of the Highway Research Board.

"If night driving could be made as safe as daytime driving," he said, "highway accidents would be reduced by one-third and almost half of the lives lost might be saved." As reported by Arnold Vey (proceedings of highway research board) in New Jersey 44 per cent of the total accidents one year and 55 per cent of the fatalities occurred at night. The National Safety Council's "Accident Facts" for 1937 reports that in 26 states 48 per cent of all personal injury and 60 per cent of all fatal accidents occur at night.

Having heard such statistics, the road showmen adopted a report of the Problem Committee on Highway Illumination which made the following recommendations.

FIRST, that the American Road Builders' Association adopt as a fundamental part of its program the principle of increasing both day and night visibility on highways—(a) by eliminating curves and obstacles which interfere with daylight visibility and (b) by installation of highway illumination to give day visibility at night.

SECOND, that the American Road Builders' Association vigorously advocate—

1. Installation of adequate highway lighting on heavy traffic highways connecting cities.

2. Similar lighting for new highways where there is a heavy traffic expectancy.

3. Installation of highway lighting on five or more mile stretches in other sections of populous states where traffic and accident records indicate lighting would prove beneficial.

THIRD, that the American Road Builders' Association of itself, or in cooperation with other national organizations, sponsor a fact finding programm to include investigation of present and proposed highway lighting installations to obtain further information on—

1. Effectiveness of highway lighting as a means of preventing night traffic accidents and of increasing night traffic.

2. Cost of installation, operation and maintenance of lighting equipment.

3. Cost of traffic accidents and the value of more even distribution of the 24-hour traffic correlated with No. 2.

FOURTH, that the Problem Committee on Highway Illumination be continued as the agency of the American Road Builders' Association to assist in carrying out these recommended plans.

The committee did not specify how

1938 Road Show Aims

RESOLUTIONS adopted by the 35th annual convention of the American Road Builders Association included:

THAT the association work to prevent diversion of motor revenues by constitutional amendments in those states where this has not already been accomplished.

THAT states adopt legislation preventing erection of advertising signs within the bounds of highways.

THAT there should be federal aid to cities for streets which connect state and federal highways.

THAT all the counties in the various states make full use of federal funds for secondary road improvement.

YOU CAN DEPEND ON CHAMPION TO BACK YOU WITH MORE ADVERTISING

The primary force that makes any product acceptable to the consumer is reputation.

The greater and more continuous the advertising back of a product, the greater the recognition of its reputation.

Champion's reputation is squarely based on quality and performance.

Hence, *profits and turnover for the Champion dealer* are continuous.

In 1938 dealers handling Champion Spark Plugs will again have the advantage of the strongest advertising support in volume, size and dominance of all markets ever put back of a spark plug.

Study these national magazines, farm publications, fleet papers, motor boat books and newspapers which will carry Champion schedules throughout the year. You'll see that Champion gives you advertising support that is unequalled.

CHECK AND CLEAN SPARK PLUGS WHEN YOU CHANGE OIL

SOHIO
OHIO PAVES THE WAY to longer-lived-safer roads with ASPHALT!
Here's the record OF ELEVEN LEADING STATES
RESEARCH LABORATORY YIELDS A NEW YARDSTICK
TO ACCURATELY MEASURE ROAD LIFE.
ACTUAL TESTS
TYPE OF MATERIAL
BEAM-TESTING MACHINE
AND SHOWS
PAVEMENTS NOW USED BY OHIO WILL LAST YEARS LONGER.
COMMON-SENSE ANSWERS TO COMMON HIGHWAY PROBLEMS
OHIO USES ANTI-SKID ASPHALT SURFACING TO PROTECT
ASPHALT
ROAD-TESTS SHOW ASPHALTS SUPERIOR. SAFER ANTI-SKID QUALITY
IN 1937 OHIO SPENT $ 5,020,597.00 FOR 379.242 MILES OF ASPHALT WIDENING AND RESURFACING.
THE SAME AMOUNT WOULD HAVE BOUGHT ONLY THIS MUCH COSTLY, NON-FLEXIBLE PAVING.

Standard Oil Co. exhibit at the 35th annual American Road Builders Association show emphasized the advantages of paving with an oil industry product, asphalt. Machinery in the foreground, developed by Sohio technicians is used to test the longevity of various asphalt pavements. The saw, used to cut paving samples, provided paper weights for show visitors. The graph in the background depicts the state of Ohio's experience with asphalt paving

the costs of highway illumination could be met, but concluded that an "analysis of specific sections of highways shows that the cost of excess night accidents amounts to a sum sufficient not only to pay the operating and maintenance charges of adequate highway lighting, but will annually leave a substantial sum with which to write off the installation charges."

Diversion was Funny to Webster, But Not to Road Builders or Oilmen

NOAH WEBSTER defined diversion as the "act of turning aside from a course or from an occupation or a purpose; also that which relaxes or amuses."

To road builders, as to oil men, there is nothing very amusing or relaxing in diversion, as M. D. Van Wagoner of Lansing, Mich., Michigan highway commissioner, pointed out in his report on diversion to the Road Builders Show.

Biggest all time attempt at diversion to date, however, came just before the road builders met. President Roosevelt advised Congress that federal appropriations for highways should be cut.

In comment before the road show, Charles D. Vail of Denver, Colorado highway engineer, said, "I dislike exceedingly to take issue with President Roosevelt," but "allotments to the states for 1939 have had a string tied to them. We are advised that we should not set up any projects for these federal funds until Congress has had an opportunity to reconsider the authorizations.

"We know that pressure will be brought to bear on Congress to reduce the authorizations for 1939 and succeeding years.

"The federal government is levying a tax of one cent per gallon on gasoline, and excise taxes on new cars and trucks, on lubricating oils, on tires, auto parts and accessories.

"The federal treasury has received from these levies approximately $300,000,000 annually for the past several years. The revenue for the current fiscal year is estimated at $349,900,000

"Compare these figures with the federal appropriation of $238,000,000 for the present fiscal year for all highway purposes, including regular federal aid, grade crossing eliminations,

(*Continued on page* 52)

Not a road builder's dream, but a cloverleaf built in 1936 on Worcester Pike at junction of Route 20, Massachusetts

NAPHTHAS · FUEL OILS · DIESEL FUELS

KEROSENE · GASOLINE · INDUSTRIAL

AUTOMOBILE LUBRICANTS

BRIGHT STOCKS

Nine strategically located **SHELL** *Refineries*

CALIFORNIA

COALINGA, DOMINGUEZ, MARTINEZ, WILMINGTON

GULF COAST

HOUSTON, TEXAS; NORCO, LA.

MID-CONTINENT

EAST CHICAGO, IND.; WOOD RIVER, ILL.; ARKANSAS CITY, KANSAS

Middlewest Jobbers' Gallonage Grew Faster During 1937

By **A. S. JAMES**
N. P. N. Staff Writer

THE trend in retail distribution of motor fuel in 1937 in the middle west was away from the marketing departments of the major oil companies and toward that heterogeneous group of jobbers, semi-majors and independents that compose for purposes of discussion and comparison the "other companies."

That is indicated by a comparative study of gallonage figures based on motor fuel tax returns for eight to 10 months of 1936 and 1937 in six states selected at random and in one metropolitan area. The states are Missouri, Kansas, Iowa, Oklahoma, Indiana and Illinois, while Chicago is the city included.

The comparative gallonage figures are shown in an accompanying series of tables. Before studying and discussing them, however, it must be kept in mind that many of the "other companies" actually are distributors of major brand products and the major companies accordingly have not done as badly from a gallonage increase standpoint as the figures might otherwise indicate.

With that fact in mind it might be well to study first the figures for the Chicago area, a highly competitive battleground among and between the majors and the other companies.

It will be seen that the total gallonage increase for the first nine months of 1937 over the same period of 1936 was 10.7 per cent. The majors experienced an increase in their gallonage of 4.6 per cent while the other companies experienced an increase of 25.2 per cent.

Looking now at the total increase in gallonage, it will be noted that the major companies obtained 30.1 per cent of that amount, while the other companies secured the remaining 69.9 per cent.

In the state of Illinois, however, the total gallonage increase amounted to 10.5 per cent, with the majors increasing their gallonage 7.3 per cent and the other companies 15.8 per cent. Of the actual increase the majors obtained for their share 42.3 per cent, and the other companies 57.7 per cent.

Except for changes in percentages the picture is the same also in Indiana and Missouri, except that in the latter state the major companies obtained only about one-fourth of the actual increase in gallonage.

The picture is somewhat different in Iowa for the 10 months of 1937, as compared with the 10 months of 1936. With a total gallonage increase of 7.6 per cent, the major companies experienced an increase in their business of 7.2 per cent, while the other companies had one of 8.1 per cent. But when the actual gallonage is compared it is seen that the majors obtained 52.7 per cent of it, while the other companies obtained 47.3 per cent.

The other companies really stepped out in Kansas. With an increase in total gallonage for the state for the first eight months of 6.6 per cent, the majors boosted their gallonage only 1.1 per cent, while the other companies enjoyed a 12.3 per cent gain. And of the actual increase in gallonage the majors obtained only 8.6 per cent, with the other companies getting 91.4 per cent.

Oklahoma's figures show the majors obtained 18.9 per cent of the actual increase with the other companies obtaining the remaining 81.1 per cent.

One of the major causes for this apparent shift in retail distribution is the policy several major companies have

Comparison of Gasoline Gallonage of Major Companies With That of Other Companies in Several Middle Western States for 10 Months of 1936 and 1937 As Indicated From State Motor Fuel Tax Reports. Figures Are Also Given for Chicago Area for Nine Months

(*Figures in Thousands of Gallons*)

	Total Gallonage	Majors' Gallonage	% of Total	Others' Gallonage	% of Total
CHICAGO AREA:					
First 9 months—					
1936	328,459	231,070	70.3	97,389	29.7
1937	363,624	241,665	66.5	121,959	33.5
Increase	35,165	10,595	30.1	24,570	69.9
% Increase	10.7	4.6	....	25.2	....
(Majors included: S. O. Indiana, Phillips, Sinclair, Shell, Texas Co., Socony-Vacuum and Pure.)					
ILLINOIS:					
First 9 months—					
1936	898,206	553,018	61.6	345,188	38.4
1937	992,951	593,125	59.7	399,826	40.3
Increase	94,745	40,107	42.3	54,638	57.7
% Increase	10.5	7.3	....	15.8	....
(Majors included: S. O. Indiana, Sinclair, Shell, Texas Co., Phillips, Socony-Vacuum, Mid-Continent Petroleum Corp., Cities Service, Pure, Continental Oil, Skelly, Gulf.)					
INDIANA:					
First 10 months—					
1936	465,892	302,123	64.8	163,769	35.2
1937	517,912	326,803	63.1	191,109	36.9
Increase	52,020	24,680	47.4	27,340	52.6
% Increase	11.2	8.2	....	16.7	....
(Majors included: S. O. Indiana, Shell, Texas Co., Sinclair, Gulf, Phillips, Socony-Vacuum, Mid-Continent Pet. Corp., Pure, Cities Service, Continental Oil.)					
KANSAS:					
First 8 months—					
1936	302,021	154,465	51.1	147,556	48.9
1937	321,836	156,174	48.5	165,662	51.5
Increase	19,815	1,709	8.6	18,106	91.4
% Increase	6.6	1.1	....	12.3	....
(Majors include: S. O. Indiana, Phillips, Sinclair, Socony-Vacuum, Continental Oil, Texas Co., Skelly, Shell, Cities Service, Mid-Continent Pet. Corp.)					
OKLAHOMA:					
First 9 months—					
1936	263,170	127,706	48.5	135,464	51.5
1937	281,512	131,177	46.6	150,335	53.4
Increase	18,342	3,471	18.1	14,871	81.1
% Increase	7.0	2.7	....	11.0	....
(Majors included: Continental Oil, Texas Co., Phillips, Sinclair, Magnolia, Cities Service, Mid-Continent Pet. Corp., Skelly, S. O. Indiana, Shell.)					
IOWA:					
First 10 months—					
1936	385,956	214,451	55.6	171,505	44.4
1937	415,326	229,918	55.4	185,408	44.6
Increase	29,370	15,467	52.7	13,903	47.3
% Increase	7.6	7.2	....	8.1	....
(Majors included: S. O. Indiana, Phillips, Mid-Continent Pet. Corp., Shell, Sinclair, Skelly, Cities Service, Continental Oil, Texas Co., Socony-Vacuum.)					
MISSOURI:					
First 10 months—					
1936	465,466	266,767	57.3	198,699	42.7
1937	510,983	277,883	54.4	233,100	45.6
Increase	45,517	11,116	24.4	34,401	75.6
% Increase	9.8	4.2	....	17.3	....
(Majors included: S. O. Indiana, Phillips, Shell, Sinclair, Texas Co., Continental Oil, Socony-Vacuum, Skelly, Mid-Continent Pet. Corp., Cities Service.)					

used in the past two years or more of turning over by lease or otherwise the operation of their bulk and retail distributing systems in many localities to good, live jobbers already established in those communities. The jobbers, of course, handle the major's products.

This method automatically shifted the responsibility of tax remittances to state and federal government to the jobbers and accordingly boosted the gallonage figures credited to the other companies at the expense of the gallonage of majors as indicated by their tax payments.

Not all of this increase in gallonage by the other companies, however, can be attributed to that one factor. It will be recalled that in September, 1936, the major companies began extending the so-called Iowa Plan to other middle western states. This undoubtedly caused some realignment of gallonage in the first part of 1937.

Some of the increase experienced by the other companies also may be traced to price cutting which attracted some business away from the retail outlets operated by the major companies; and some to the fact that in many instances jobbers have been less prone of late to follow the major companies on their posted retail prices and have been meeting competition on a more extensive scale.

After summing up those factors and others that undoubtedly contributed some part to the gallonage increase credited to the other companies, the definite conclusion can be drawn that the jobber apparently is swinging back into the position of a very important cog in the retail distribution of petroleum products in the middle west. The major companies, at least many of them, apparently are showing a greater willingness to let the home town fellow distribute their products. He knows conditions in his own locality better than could an executive sitting in a division office with scores of communities in his territory, none of which he can live in long enough to get the "feel" of the locality.

One evidence of that fact is the statement recently of a major company operating extensively in the middle west that the gallonage through jobber outlets has been increasing approximately twice as fast as has the gallonage through the company-operated outlets.

Port Arthur Oil Shipments Up

PORT ARTHUR, Texas—With a 11,000,000 barrel gain over 1936, the petroleum industry in this area kept pace with the national increase in cargo shipments in 1937, according to the local chamber of commerce.

Reports showed The Texas Company's vessel shipments of crude oil and refined products totaled 67,979,396 barrels last year, an increase of more than 6,000,000 over the year before.

Gulf Oil Corp. cargo shipments to coastwise and foreign destinations from its local plant in 1937 amounted to 45,268,175 barrels, a gain of some 5,000,000 barrels over 1936.

Coal Industry Renews Efforts For Tax On Fuel Oil

Pictured here is the Pennsylvania delegation that went to the White House last week to ask President Roosevelt's support for a tax on fuel oil to "equalize" competition with coal. Left to right, there are Representative J. Harold Flannery, Senator Joseph E. Guffey, and Representative Patrick Boland, the majority whip in the House and author of the fuel oil tax bill. Boland told the President that the proposed tax would bring in $168,000,000 besides serving as a "conservation" measure for petroleum resources—Acme Photo

The coal industry is intensifying its campaign to "equalize" competition between fuel oil and coal — that is, to hike fuel oil prices in an effort to make oil consumers forget its cleanliness and other advantages and turn to using coal.

The phenomenal increase in oil burner installations, coupled with government regulation and price-fixing in the bituminous coal industry under the Guffey coal law, has fired the "equalizers" with new zeal.

President Roosevelt last week received a Pennsylvania delegation, made up of Senator Joe Guffey and Congressmen Patrick H. Boland and J. Harold Flannery, and heard them urge that the Administration support the Boland Bill to tax at the rate of one-cent a gallon all fuel oil used for heat or power in the U. S.

Later, at his press conference, President Roosevelt was non-committal, saying it was a matter for the Ways and Means Committee. But there will be a general revision of the tax laws this session, observers pointed out, so the revenue-hungry Treasury experts may look with favor on Boland's claim that his fuel-oil tax would bring in $168,000,000 a year.

Another approach to the oil-coal equalization scheme was seen in the study undertaken by the National Bituminous Coal Commission, administering the Guffey coal law, which has been labeled "a survey into the competition between bituminous coal and other fuels."

Although NBCC officials declined to discuss the "survey", it was learned that the study will in all probability delve into the effect of the recent price-fixing orders of the coal commission as regards its competition with fuel oil, gas, electrical power, and other fuels.

Conducting the NBCC study of competing fuels is Dr. F. G. Tryon, chief of its marketing statistics division and formerly with the coal economics division of the U. S. Bureau of Mines. For several years before he left the Bureau, Dr. Tryon favored such a study.

There are grounds for believing that Dr. Tryon shares the opinion — prevalent among certain of the "planners" in the New Deal — that petroleum should be used for gasoline and lubricating purposes only; that it should not be used for heating purposes at all.

At the World Power Conference in Washington in September, 1936 (See, NATIONAL PETROLEUM NEWS for Sept. 9 and 16, 1936), Dr. Tryon was the joint author of a report which contained this significant recommendation:

"The national energy economy demands that technological research should be centered on coal so that it can meet all the requirements which do not specifically demand a liquid fuel. The petroleum supplies should be reserved for those special automotive needs that can be best served by a liquid fuel, thus delaying as long as possible the day when

motor fuel must be made from coal at necessarily higher cost."

That thread of thought ran through many of the papers presented by government officials at the power conference. Indeed, President Roosevelt himself touched on it when, in greeting the conference delegates at the White House, he mentioned the possible need for "apportioning our natural resources to specific uses."

So, there is some ground for regarding this "study of competing fuels" as a step toward "equalizing" competition with coal, either through taxation or regulation of gas and oil.

In their arguments for a fuel-oil tax, the coal people pass lightly over the effect on coal consumption to stress the revenue-raising possibilities.

After conferring with President Roosevelt last week, Congressman Boland brushed aside newspapermen's suggestions that the bill was intended to aid the coal industry. He insisted that it was a measure to raise revenue and at the same time conserve an "irreplaceable natural resource."

But there is no getting around the fact that the purpose of the bill is to hamstring fuel-oil competition.

In an article in *Coal Age,* entitled "Coal Widens Objectives in Drive on the Economic Front," efforts in 1937 of the coal industry to kill off fuel-oil competition are frankly related.

The article says, "Anthracite producers were also busy during the year, along with the bituminous fraternity, in . . . sponsoring legislation designed to put the brakes on oil and gas and imported coal by the imposition of taxes or duties."

The article also mentions that the Anthracite Institute, Inc., had "a war chest of roughly $1,000,000 for the year." Purpose of the Institute, organized in 1936, was stated to be coordination of producers and distributors, equipment manufacturers and allied industries and promotion of automatic heat with hard coal.

Further on the article tells about the promotional campaign conducted last year, then adds, "And in addition to battling substitutes (for coal) on the consumer's doorstep, organizations representing producers, distributors, equipment manufacturers and allied interests, as well as the public in mining regions, continued their efforts to bring these products under some measure of control in order to equalize coal's competitive power."

In that sentence from *Coal Age* is a summarized picture of coal-mine operators, distributors, coal miners' unions, coal equipment manufacturers and the voters in mining towns ganging together to seek a tax on oil and gas in an effort to force consumers to use coal instead. That explains the pressure behind the Boland Bill at Washington and similar bills in state legislatures.

Further, on the article states; "Control of oil and gas competition, (with coal) as noted above, was sought in three major directions: taxing or regulatory legislation; research to improve the efficiency of coal utilization, as well as to develop new outlets; and promotion of satisfaction with coal heat on a national basis in addition to smaller-scale efforts."

Fuel Complaint? Maybe It's Water In the Customer's Fuel Tank

IT'S not the gasoline; it's the weather. Many times, particularly in climates where temperatures change suddenly, motorists will blame poor engine performance on the spark plugs, distributor, or on the fuel.

Looking further into the trouble, it is often found that the real root of the trouble is that water has found its way into the motorist's gasoline tank.

In a recent bulletin, the American Petroleum Institute points out that this appearance of water in the tank may be due to sudden changes of temperature, such as backing a car out of a warm garage into zero temperatures. High-pressure washing equipment, when not properly handled, is also blamed by engineers for water getting into the tanks, according to the institute bulletin.

Leakage of rain, slush, or melted snow through poorly fitted fill caps on gasoline tanks, or through the breather holes, is another source of water contamination, the bulletin points out.

Fuel systems of modern cars are equipped with strainers to prevent water and dirt from entering the carburetor, and service station tanks are fitted with safety and checking devices to permit only gasoline to enter the automobile fuel tank, but in spite of these precautions water does creep in unless extreme care is exercised.

The bulletin states that "the results of such water accumulation in tank and fuel line include stoppage of the flow of fuel from tank to carburetor, and uneven motor operation and reduced power output. Since water is heavier than gasoline and the two never mix, prevention of such troubles is viewed as presenting no great difficulty".

Among the recommended methods to correct this trouble, the institute bulletin suggests the following: periodic draining of fuel pumps, and of water and sediment traps in fuel lines; immediate replacement of fill cap gaskets that are found to be worn; the use of properly fitting tank caps and keeping the gasoline tank full, to minimize condensation of water vapor by reducing the air space.

Auto Show Date is Set Nov. 11-18, New York

DETROIT, Feb. 7. — The week beginning Nov. 11 has been selected as the date for the National Automobile Show, according to an announcement made following a meeting of the board of directors of the Automobile Manufacturers Assn., sponsor of the show.

This year's show, which will again be held in Grand Central Palace, New York City, comes almost a month later than the last fall date of Oct. 27. Dealers have expressed varying opinions as to the proper time for the shows, with suggestions ranging from Sept. 1 to Jan. 15, but all agreed that the show and the new model announcements should be coincidental. During 1937, some 1938 models were publicly introduced a month before the show date.

The truck manufacturer-members of the A. M. A. have voted against the promotion of a National Truck Show, this year, and have recommended that the show committee report before Oct. 1 on the advisability of a truck show in New York in 1939.

Natural Gas Reaches New Record

WASHINGTON, Feb. 7.—A new record of 2,167,802,000,000 cubic feet was reached in the marketed production of natural gas in 1936, according to final figures for that year made public by the Bureau of Mines, Interior Department.

The new record represented a gain of 13 per cent over the 1935 figure, and 12 per cent over the previous record of 1930 (1,943,421,000,000 cubic feet).

Exports of natural gas amounted to 7,436,000,000 cubic feet, of which 7,352,000,000 cubic feet went to Mexico and 84,000,000 cubic feet to Canada. Imports from Canada amounted to 152,000,000 cubic feet. All three foreign trade items showed gains over 1935.

Largest gain in domestic consumption was in general industrial uses—19 per cent higher than in 1935. Consumption in the manufacture of carbon black increased 17 per cent, and that used for domestic and commercial purposes, 10 per cent.

There were 53,960 producing gas wells at the close of 1936, compared with 53,790 at the close of 1935.

Value of natural gas at the wells continued its downward trend in 1936, the report shows, averaging 5.5 cents in 1936, compared with 5.8 cents in 1935 and 6 cents in 1934. Although the average continued to be dominated by the large volumes of cheap residue gas from natural-gasoline plants in California, Oklahoma and Texas, the Bureau notes that well values also decreased in 1936 in the eastern producing states, where they are relatively high.

ADVERTISING PAGES REMOVED

Petroleum Service Co.'s new Minneapolis service station. Note the sweeping front of the station building, and the super-structure. The two display windows on the left are in a decorative wall. The door just beyond leads to modern, tiled rest rooms. Then comes the automotive merchandise sales department. The three wide doors are to the service department. To the extreme right is the display room for household electrical merchandise

Ample Floor Space In Service Bays

By **E. L. BARRINGER**
N. P. N. Staff Writer

• • •

MINNEAPOLIS

SOME of the oil industry's new service stations are neat, trim outlets and some are exceptionally outstanding stations combining the newest in practical and decorative architecture. In this second classification is a station opened late last autumn by the Petroleum Service Co. at 10th and La Salle streets, on the border of Minneapolis' retail business district.

The station is exceptional, on the exterior, for the Neon action signs, the decorative super-structure and for a front wall that is one sweeping curve. The station interior is noted for the arrangement of the service department space, for the large automotive merchandise department, and for the electrical household appliance sales department.

While the station has been open only a relatively short time an exceptionally large number of lubrication jobs have crossed the lifts and contests have been successfully conducted in selling automotive merchandise.

The service department—for lubrication service, crankcase draining, tires, batteries, and car washing—is in the center of the building, in a room about 65 feet square. The department has three entrances from the gasoline drives, one to each lift and one to the tire and battery departments.

Each lift is directly in front of the entrance. Each lift has a standard with a double drain line and a double gear lubricant dispenser. There is an overhead chassis lubricant line for each lift, and specialized lubricants are kept in containers along the wall.

The lifts are for crankcase draining and under-chassis lubrication. When these parts of the lubrication job are completed the automobile is moved to the flat surface space in front of the lifts, for finishing the lubrication job and the car servicing, thus cutting down the time of each car on the lift. The flat surface space is large enough for two cars in front of each lift. While two men are working on the lifts three men are completing the lubrication and servicing work.

The service department operates on a straight line basis, as the room has exit doors in the rear wall leading to the alley. Thus cars enter the department off the gasoline drive and after servicing leave through the rear doors, without a back haul through the entrance doors to the driveways.

The tire, battery and car washing departments are along the wall, opposite the lubrication department. Customers for these departments enter off the gasoline drives through the third entrance door, and head into the wall. Five automobiles can be handled at one time in the tire and battery departments. At the far end is the car washing space.

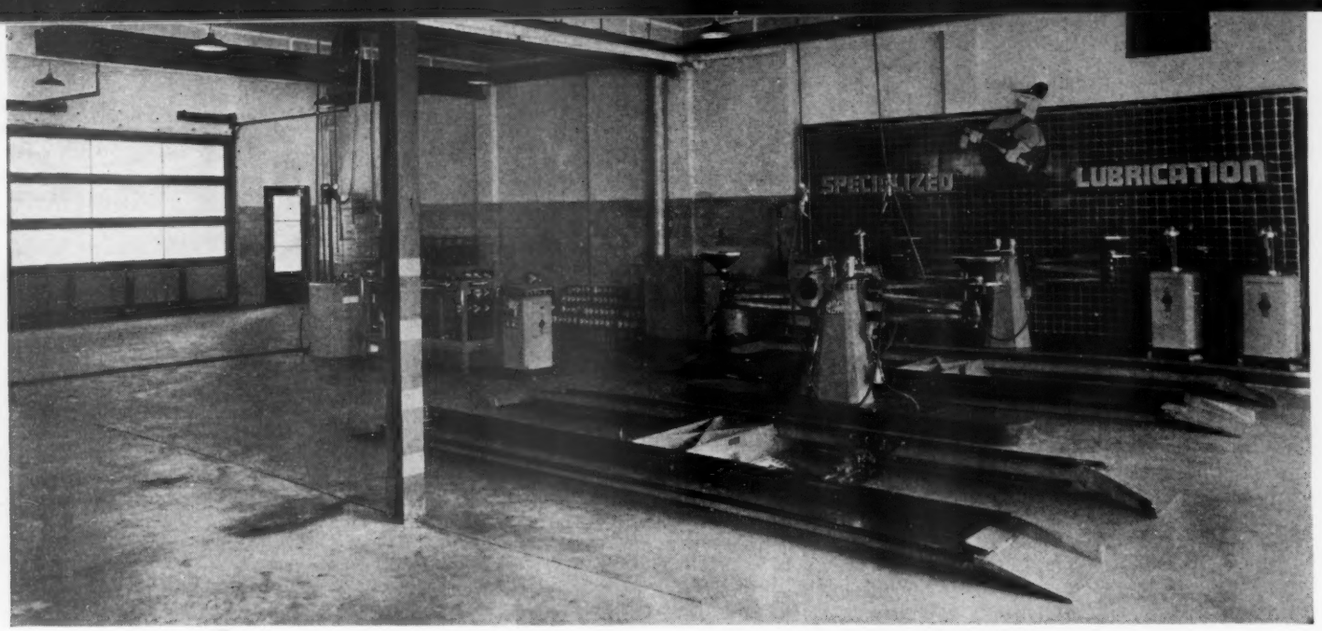
Automotive merchandise is displayed in a separate room, adjoining the gasoline drives and in front of the service department. Merchandise attracts attention in the 5 and 10-cent store manner, through being displayed on tables, with all items plainly priced.

The best display spot, in the opinion of H. C. Moline, manager of the La Salle service station, is in the front corner, by the cash register. Station salesmen coming in to ring up the sale are reminded of suggestion selling, he points out, and also the customer coming in for change will wait by the cash register where he is more apt to see merchandise on display.

AFTER the La Salle station had been operating for several months the household electrical appliance department was opened. A special sales force operates this department. Merchandise is displayed in a room, off the lubrication department fronting the sidewalk along La Salle Ave. The department markets refrigerators, washing machines, vacuum cleaners, electric and gas kitchen stoves, and electric irons. Radios, house and auto, have been sold in the automotive merchandise department.

Lubrication has been the most profitable department, Mr. Moline reports. In the first three months over 1200 different lubrication customers were in the station, and this is the number of individual customers, not the total number of jobs, he points out.

In merchandising the station's service the management relies on personal selling, direct mail follow-ups on lubrication, and sales contests for the staff. The territory within five or six blocks of the station has been inten-



The lubrication department of the new Minneapolis station. Crankcase draining and under-chassis lubrication work are done on the lifts. Cars are then moved to the forward flat surface bays for the remainder of the lubrication and the servicing work

sively covered for the business of private automobiles. The station does not solicit fleet business.

On lubrication service two follow-up cards are mailed. If the customer does not return then for further service the follow-up is through a personal call.

While the staff is alert to sales opportunities, such as gasoline platform men turning in tire prospects from seeing bald-headed tires on the drives, each month the staff has a special cash award in a sales contest, on seasonable merchandise.

Incidentally, the radio contest one month early in the winter, was won not by a front end salesman but by a man off the grease rack. In spite of working on the 3 to 11 p. m. shift the lubrication man outsold all others in the station, the sales being made off the station drives. "I believe most of the sales were made to people who were not customers of the station," said Mr. Moline.

Each Thursday evening there is a sales meeting for the staff. A speaker from outside the organization talks about the selling of some one product. Then one of the staff is assigned to give a 15-minute sales presentation on the item discussed at the previous meeting.

IN general lay-out the station is similar to the typical L-shaped building. The household electrical appliance sales department is at one end of the long part of the L. Then comes the service department, and on the short side of the L is the automotive merchandise department. That is the arrangement, considering only the interior of the building, but from the exterior the typical sharp corners of the customary L-shaped structure have been smoothed into long sweeping curves.

The station building was set along the rear property line. A front was built along what would be the wall of the adjoining building, at the height of the station building roof, and two large display windows set in the wall.

To further emphasize the sweeping curved front of the station, there is the super-structure above the roof line. This super-structure, of corrugated sheet steel, is higher than the building itself.

In the middle of the super-structure is a smaller section of corrugated sheet steel bearing the petroleum trade marks "Tydol" and "Veedol" and two of the trade-mark engineers of Tidewater.

All the trade-marks are lighted with Neon lights. The two engineers are in action, their feet moving and oil dripping from the oil can spout. Indirect lights are concealed behind the corrugated strips carrying the trade marks.

Automotive merchandise salesroom in the Petroleum Service Co.'s new Minneapolis station. The station office is at the rear, beyond the glass partition, and to the rear is the tire and battery section of the service department

S & J Announces Lower Prices!

This is one of four different types of S. & J. Internal Safety Valves, suitable for any type of internal mounting. Furnished in bronze or aluminum in sizes from 1½ to 6 inches.

EFFECTIVE as of February 1, S. & J. announces substantial price reductions on their entire line of hydraulic internal valves and incidental equipment. These price reductions now place S. & J. Hydraulic Safety Valves within the financial range of every truck operator who wishes, or is required by law, to use internal safety valves.

Last year was a banner year for S. & J. internal hydraulic valves. The increased volume of sales has permitted production economies which are directly reflected in S. & J's new low prices. This is the fourth consecutive price reduction made possible by your increasing purchases, and we pass the savings on to you.

Our new prices make Hydraulic Valves available to you at prices that are equivalent to or lower than current prices of most mechanical valves. In addition to the price advantage, you receive a valve that is listed by Underwriters Laboratories; you obtain the positive action and satisfactory service that is inherent in the hydraulic principle. Write for our book "Transporting Inflammable Liquids with Safety".

LISTED BY

Underwriters' Laboratories

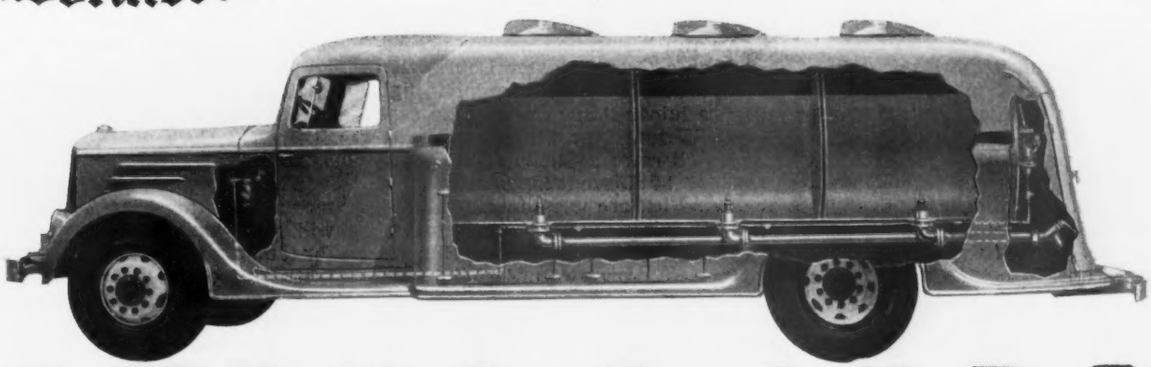
SHAND & JURS CO.

BERKELEY, CALIFORNIA

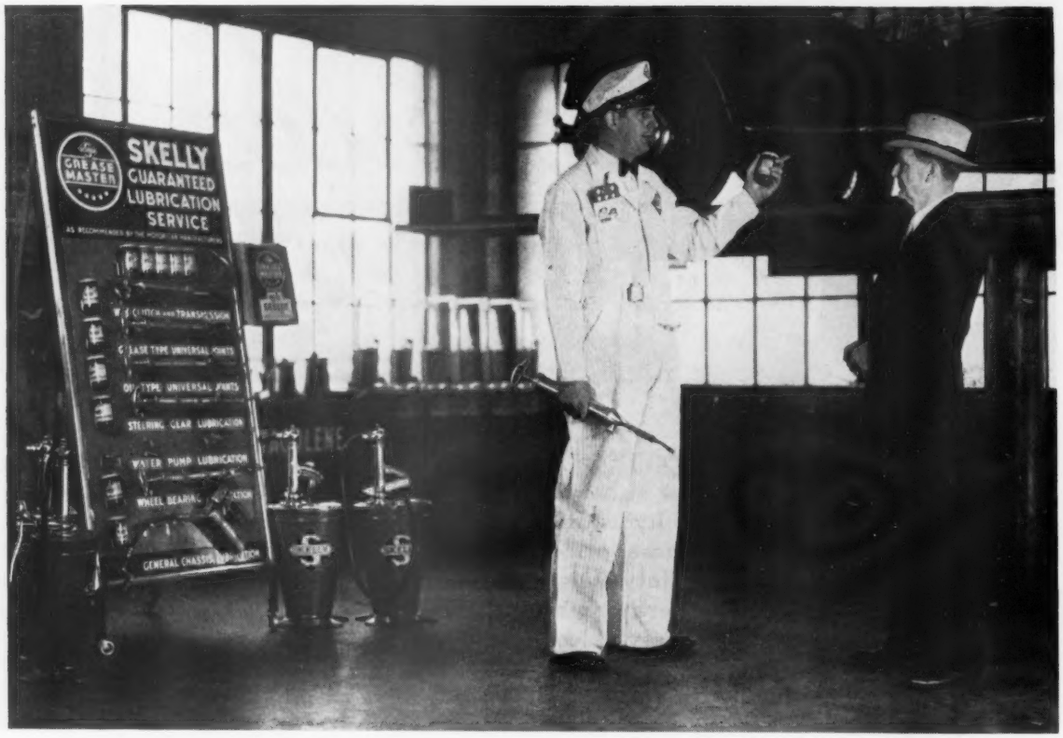
295 Madison Ave.
New York

601 Fannin St.
Houston

225 W. 11th St.
Los Angeles



SHAND & JURS



One of the requirements of a Skelly Oil Co. Grease-Master is that he know the cars he lubricates and the kinds of greases and oils required. This operator is explaining to a customer why a certain type of grease is required at a certain point. In his hand is a jar of the grease, one of several samples kept on the board shown at the right

"GUARANTEED" Lubrication Offered by Oil Company

SKELLY OIL CO. is pushing car lubrication sales at its own company stations and it is also providing a plan which its jobbers are using profitably to build up car greasing jobs at their own outlets.

The main feature of this company's "Grease-Master Service" is a written guarantee that the grease job performed according to its instructions and with the recommended lubricants will give the car thorough lubrication for the number of miles the car manufacturer advises.

If within the period of the manufacturers guarantee squeaks should develop due to lack of lubrication, any Skelly Grease-Master will re-lubricate free of charge. And if the grease job should prove unsatisfactory in any respect to the car owner, the guarantee calls for a correction of the trouble at any Grease-Master lubrication department or a refund of the customer's money.

The company's marketing officials realized that by offering such a guarantee they were crawling out on a limb unless they took steps to guarantee to the company that each lubrication job done under the Grease-Master Service plan would be up to a certain standard. The result was the adoption of rigid requirements before a service station's lubrication department could be listed as a place giving its 5-Star guaranteed lubrication service.

Each department properly equipped to give the lubrication service accordingly has a Grease-Master Lubrication Board containing both low and high pressure lubrication guns to take care of the different type fittings and pressure on all cars; a Skelly Chek-Chart; a stock of 14 different kinds of oils and greases which are used on all automobiles according to the manufacturers' specifications; steering wheel hanger cards which carry a record of the services rendered by the salesman, together with the written guarantee; a record card file of lubrication on all customers' cars; and a follow-up file used to notify customers when it is time for another complete lubrication service.

When a Grease-Master completes a grease job, he attaches the steering wheel card, on which is checked the 16 free services, which include cleaning of windshield, headlights, windows, license; checking of the gasoline tank, transmission, differential, crankcase, lights and horn; and servicing of the battery, radiator and tires, including noting the pounds of air placed in them and spraying the springs. The card also lists the number of lubrication points on the car, and the number of lubricants used.

The guarantee section at the bottom of the steering wheel card carries the Skelly Oil Co.'s guarantee on the job as follows:

"This Grease-Master guarantee means that this Five Star Grease Job will give your car perfect lubrication for the number of miles your car manufacturer recommends it should run between grease jobs, barring mechanical defects and for a period not to exceed 30 days. For example, if within the guaranteed period due to lack of lubrication your car should steer hard or your shackles squeak, any Skelly Grease-Master will grease them without charge. If during this period this Five Star Grease Job is unsatisfactory

or fails in any respect to satisfy you, present this guarantee receipt at any Skelly operated service station. The Grease-Master will gladly correct your trouble or refund your money."

The other side of the guarantee section of the steering wheel card provides for the customer's name, address and car license number, date the lubrication service was given, the town, car mileage and carries the endorsement signature of W. G. Skelly, president of the Skelly Oil Co. It is also to be endorsed by the Grease-Master doing the lubrication work.

The 5-Star grease job gets its name from the listing on the guarantee that: (1) The correct lubricant was used at each point; (2) the correct amount of lubricant was used at each point; (3) the lubricants were applied correctly; (4) every point requiring lubrication was lubricated, and (5) the grease job must give complete satisfaction or money will be refunded.

Finally the company furnishes each attendant at a Grease-Master Service lubrication department with an emblem to be worn on his uniform only after he has passed actual tests proving he knows how to lubricate an automobile.

The company found the plan so successful at its own stations that it later offered it to its jobbers throughout the territory in which it markets. Many of these jobbers, company officials say, have reported the adoption of the plan along with the sales stimulation possibilities it offers, has enabled them to build an exceptionally good repeat business in lubrication.

New Equipment

AND THE MANUFACTURERS

"LUBRICATION MERCHANDISER" —A "Lubrication Merchandiser" booklet, designed to assist oil companies in the selection of the proper assortment of equipment for their various types of equipment, has just been completed by the U. S. Air Compressor Co., 5300 Harvard Ave., Cleveland, and is ready for distribution.

Among the booklet's many features are a ground plan showing a "well located lubrication department", and a graphic presentation of the greater revenue possible for the dealer who offers modern lubrication service.

Another feature includes a showing and description of five "Lube Groups", or combinations of lubrication equipment, for dealer stations of various types and sizes. The prices of these combinations range from $184.90 to $591.90. All equipment groups include the company's Pitlift Air Jack and merchandising material to promote a Floating Body Lubrication program.

Copies of the booklet are being distributed to oil companies, and may be obtained upon request from the U. S. Air Compressor Co.

* * *

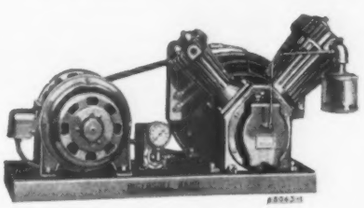
BUDGET SELLING KIT—A budget plan sales kit is now available to Edison battery dealers, according to an announcement of the Emark Battery Division, Thomas A. Edison, Inc., Kearny, N. J.

The kit consists of an office record card, with credit information; a sales agreement form; a customer's receipt book; two letters to defaulting customers; a file box with index; and metal signal tabs. All forms are imprinted with the dealer's name and address.

D. B. Banta, Edison sales promotion manager, points out that, although the plan is a part of the company's 1938 merchandising program to assist dealers in stimulating battery sales, the plan is equally applicable to other larger unit automotive sales, such as tires, radios and heaters.

* * *

COMPRESSORS — A new bulletin (No. 2118) on small industrial compressors and vacuum pumps has been issued by Ingersoll-Rand Co. on its "Type



Ingersoll-Rand Type 30 Industrial Compressor

30" line 50 models which range in size from ¼ to 15 h.p. Copies are available at 11 Broadway, New York, or at Branch offices.

* * *

General Electric Co. has opened its new $700,000 building in Los Angeles, at 212 N. Vignes St. All of the company's departments will be housed here for the city.

* * *

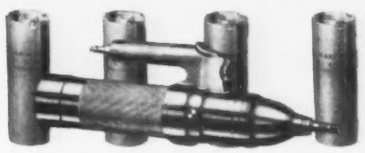
GOODRICH TRANSFER — E. T. Campbell, formerly assistant manager of petroleum sales at the Akron, Ohio, headquarters of The B. F. Goodrich Co. has been transferred to New York as assistant manager of petroleum sales in the eastern division. He succeeds William Sewall, recently named manager of the petroleum sales department at Akron. Morris A. Starr, Atlanta petroleum sales representative takes Campbell's place at Akron and is succeeded in Atlanta by E. H. Fitch.

* * *

DISTRIBUTOR EXPANDS — Climaxing an 8-year record of progress, the H. E. Bowman Co., Houston, distributors of A. Y. McDonald Mfg. Co., bulk station and service station equipment recently completed a modernistic structure to serve as the company's sales and service headquarters. Bowman's line of equipment also includes Fyr Fyter and Walter Kidde Lux carbon dioxide fire extinguishers, Bennett pumps, Eco air compressors, Alemite lubricating equipment, and Neptune meters.

* * *

POWER GUN — The Lubrication Corp., 910 S. Michigan Ave., Chicago, has announced a new Standix power gun operating from interchangeable cartridges which are refilled from stock lubricants. With the assortment of adapters furnished, the operator is



able to handle all grades of lubricant and service any fitting with the same gun.

A unique feature is said to be its convertibility from high-pressure, high-speed, single-shot action to low-pressure continuous flow by a change of nozzles. The gun offers positive prime of light or heavy lubricants at low winter temperatures, according to its manufacturers, and its operation is not affected by air pockets in the grease.

* * *

R. A. Hendrickson has been appointed manager of the oil sales section of Crane Co., Chicago, by W. H. Pape, manager of the valve and fitting department. An employe of 20 years experience, Mr. Hendrickson has had charge of the design of steel products, particularly for the oil industry, for many years.

* * *

NEW YORK, Feb. 7. — Frank H. Dewey, general manager of the air conditioning division of Gar Wood Industries, Inc., Detroit, was appointed president of the Oil Burner Institute at a recent special meeting of the institute's board of directors.

Dewey will fill the unexpired term of Charles N. Lockwood, Nu-Way Corp., Rock Island, Ill., who resigned, according to G. Harvey Porter, managing director of the institute.

* * *

GAR WOOD APPOINTS — Jerome H. Nymberg has been appointed as manager of the Detroit air conditioning branch to succeed Norman Saylor

The Accepted Standards of Pennsylvania Bright Stock Excellence Since 1900

◆

H-M and L-M Oils Are Made Solely By

THE CONEWANGO REFINING CO.

Warren, Pa.

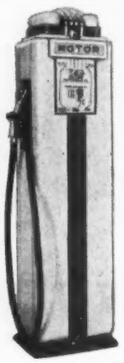
who has resigned, according to a company announcement.

Nymberg has been associated with the Gar Wood organization for 15 years, and prior to his present promotion was service and installation manager for the Detroit air conditioning branch.

Henry W. Jackson has been named to fill the position vacated by Nymberg.

* * *

METER PUMP — The latest addition to the marketing equipment line of Erie Meter Systems, Inc., is a new Series 90-91 continuous gallon direct-reading register companion meter pump. The register runs from 1 to 99 gallons by tenths of a gallon. A roll-chart shows prices for gallons delivered from 10 to 30 cents including all tenths of cents. Tax from 2 to 9 cents is also shown.



Two thumbscrews control the setting of the chart which rolls easily back and forth across the face of the register to enable quick price changes. Tables for arriving at the price of deliveries are shown in large size type of the chart. The pump matches the Erie Guardsman 70 and 71 series to enable oil marketers to keep islands uniform in appearance where these are in use.

* * *

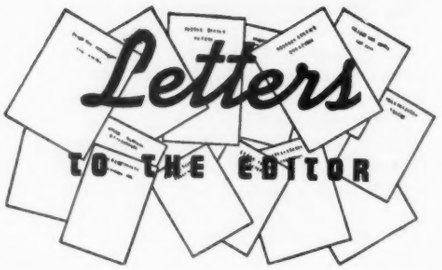
CANS—Expansion in the can business in the past five years has made it necessary for Continental Can Co. to spend $30,000,000 on new plants and plant improvements, which is twice the amount spent in the preceding five years. The company has acquired and equipped 11 complete new can manufacturing plants, making a total of 50 plants in 35 cities.

Bahrein Oil In India

WASHINGTON — Petroleum products from the Bahrein oil fields, located on the Bahrein islands off the coast of Arabia, are being introduced to the market in Bombay and other Indian cities, according to information received by the Commerce Department from its Calcutta office.

Bahrein Oil Shipments

WASHINGTON—Reflective of the recent growth of petroleum production in the Bahrein Islands off the coast of Arabia is the increase in shipments of Bahrein oil through the Suez Canal. In 1935 total tanker tonnage of Bahrein oil through the Suez Canal was 22,000 tons; in 1936 this reached 209,000 tons, and in the first nine months of 1937, 298,000 tons, according to information received by the Commerce Department from Horace Remillard, American consul at Port Said, Egypt, on the canal.



Dear Editor:

I have seen your editorial in re federal taxes.

About six weeks ago I wrote to Senators Bulkley and Donahey, as well as to all our district Congressmen, in reference to the undistributed profits and capital loss and gains provisions; also the capital stock taxes. At that time I expressed the hope that nothing in the way of amendment would be undertaken at the special session. I told them that in my opinion—an opinion which I thought was shared by most business men—these tax provisions were basically unsound, were punitive in character, and that since they were no good in their entirety, they needed repeal, not amendment.

The majority of those addressed, including Senator Donahey, agreed with the above conclusions. Senator Bulkley sent me a copy of an amendment which he proposed to the undistributed profits provision. I expected no more from Senator Bulkley.

In passing, I told these gentlemen that we had about 240 people working in this office and that they were voters, and that if the operation of these laws continued and our ability to provide surplus to tide us over future Abundant Life depressions, I would see to it that everyone knew *why and who assisted in putting them out of jobs.* It seems to me the time has passed when all public servants should be addressed in supplication.

I commend your efforts and suggestions as set forth in your editorial.

Robert E. Baker,
Cleveland, O.

TULSA—Ralph O. Dietler, vice-president of the Stanolind Crude Oil Purchasing Co., was elected president of the Tulsa Club, Jan. 25. He succeeds E. W. Thornton. R. W. McDowell, vice-president of Mid-Continent Petroleum Corp., was elected first vice-president of the club and B. Frank Bridges, Gulf Oil Corp., second vice-president.

TULSA — Eggleston Oil Products Co.'s new plant at Three Rivers, Live Oak county, Tex., will soon start operations. It has 3000-barrel capacity and will use crude from fields nearby. The same interests operate a plant at Corpus Christi.

New Patents

Compiled by R. E. Burnham, patent and trade-mark attorney, 511 Eleventh Street, N. W., Washington, D. C., from whom copies may be obtained at the rate of 25c each. State number of patent and name of inventor when ordering.

November 30, 1937

REFINING

Catalytic reaction—Mathias Pier, Walter Simon, and Paul Jacob, Germany, assignors to I. G. Farbenindustrie. Filed Jan. 10, 1934. No. 2,100,352.

Production of hydrocarbons of low boiling point—Mathias Pier and Ernst Donath, Germany, assignors to I. G. Farbenindustrie. Filed May 2, 1934. No. 2,100,353.

Treatment with hydrogenating gases of distillable carbonaceous materials—Mathias Pier, Walter Simon, and Georg Grassi, Germany, assignors to Standard-I.G. Co. Filed Mar. 9, 1935. No. 2,100,354.

Method and apparatus for utilizing molten material in heat treatment of liquids not miscible with the molten materials—William O. Pray, De Beque, Colo., assignor to Pray Research Co., same place. Filed May 7, 1934. No. 2,100,355.

Conversion of hydrocarbon oils—Kenneth Swartwood, Chicago, Ill., assignor to Universal Oil Products Co. Filed July 15, 1933. No. 2,100,414.

Process for solvent extraction of oils—Ulric B. Bray, Palos Verdes Estates, Calif., assignor to Union Oil Co. Filed Apr. 10, 1934. No. 2,100,429.

Dewaxing petroleum oils—Arthur L. Lyman and Melvin M. Holm, Berkeley, Calif., assignors to Standard Oil Co. (Calif.) Filed Mar. 12, 1935. No. 2,100,662.

Refining of mineral oils—Shanti Swarupa Bhatnagar, Lahore, India, assignor to Steel Bros. & Co., Ltd., London, England. Filed June 15, 1936. No. 2,100,707.

Conversion of hydrocarbon oils—Jacob B. Heid, Chicago, Ill., assignor to Universal Oil Products Co. Filed Aug. 17, 1935. No. 2,100,849.

Removal of wax from hydrocarbon oil—Ernest F. Pevere, Beacon, N. Y., assignor to Texas Co. Filed May 25, 1934. No. 2,100,915.

Removal of wax from hydrocarbon oil—Ernest F. Pevere and Clifford G. Ludeman, Beacon, N. Y., assignors to Texas Co. Filed Nov. 21, 1935. No. 2,100,916.

Observation chamber for flowing liquids—Louis C. Roess and Carl E. Cummings, Beacon, N. Y., assignors to Texas Co. Filed Oct. 15, 1935. No. 2,100,919.

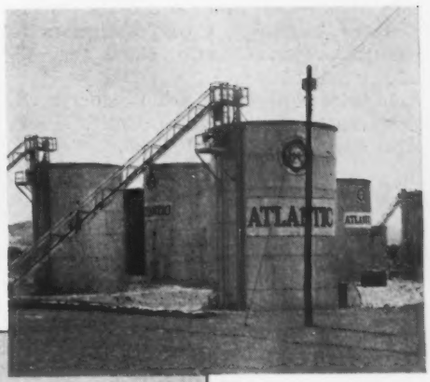
Process of cracking hydrocarbons—Albert P. Sachs, New York, N. Y., assignor to Petroleum Conversion Corp. Filed Aug. 31, 1935. No. 2,100,922.

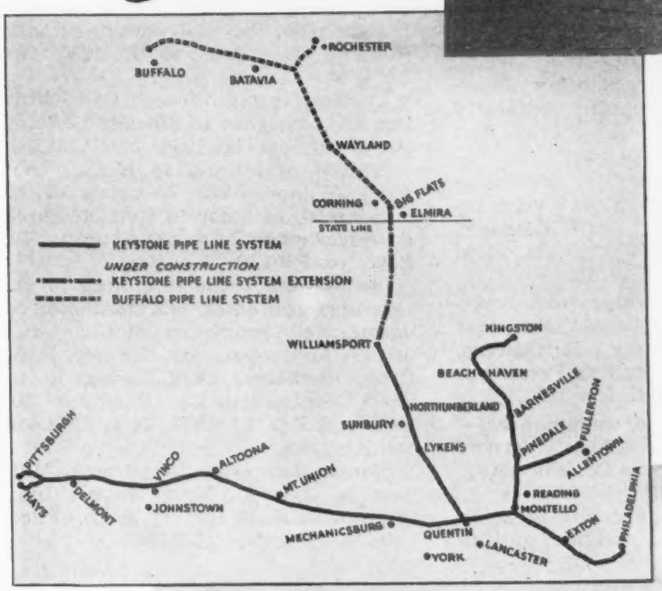
MISCELLANEOUS

Truck tank and cab—Augustine Davis, Jr., Cincinnati, Ohio. Filed Apr. 6, 1934. No. 2,100,383.

Process for production of anhydrous

For Pipe Line Service





The accompanying map shows the general location of the Keystone & Buffalo Pipe Line Systems which the Atlantic Refining Co. uses to distribute gasoline in Pennsylvania and New York. The pictures show some of the seventy-three installations of Wiggins Pontoon Roof tanks along this line. The upper picture was taken at Montello and the lower at Mechanicsburg, Pa.

IT'S hard to beat the advantages of a motor fuel distribution system that includes well-planned pipe lines with Wiggins Pontoon Roof Tanks at terminals and at bulk stations along the lines.

In Wiggins Pontoon Roofs, distribution organizations have found the key to both flexible and efficient operation. Tanks can be filled and emptied as often or as seldom as any schedule may require with complete assurance that the oil handled will continually be guarded and protected against evaporation and deterioration. Similarly, whether the tank is full, or nearly empty, matters not. This versatile performance is maintained for all grades of motor fuel or other oil products that do not boil at ordinary atmospheric temperatures.

For information or quotations, address our nearest office. Ask about latest developments in equipment for stopping evaporation losses.

Chicago Bridge & Iron Company

Cleveland	2206 Rockefeller Bldg.	Dallas	1439 Liberty Bank Bldg
Chicago	2125 Old Colony Bldg.	Birmingham	1534 N. Fiftieth Street
New York	3345—165 Broadway Bldg.	Houston	2919 Main Street
Philadelphia	1614—1700 Walnut Street Bldg.	Tulsa	1607 Hunt Bldg.
Boston	1516 Consolidated Gas Bldg.	San Francisco	1060 Rialto Bldg.
Detroit	1513 Lafayette Bldg.	Los Angeles	1422 Wm. Fox Bldg.

FABRICATING PLANTS in Birmingham, Chicago and Greenville, Pa.

WIGGINS PONTOON ROOFS

hydrocarbon derivatives — William Engs, Oakland, and Gerald H. van de Griendt, Berkeley, Calif., assignors to Shell Development Co. Filed Oct. 13, 1936. No. 2,100,437.

Lubricating composition—George S. Cavanaugh, Los Angeles, Calif. Filed Apr. 27, 1936. No. 2,100,685.

* * *

December 7, 1937

REFINING

Treating hydrocarbon oils—Charles W. Nofsinger, Orange, and Percy C. Keith, Jr., Short Hills, N. J., assignors to Gasoline Products Co. Filed Dec. 1, 1931. No. 2,101,088.

Catalyst for hydrogenating hydrocarbons—Harold M. Smith and Harry T. Rall, Bartlesville, Okla. Filed Apr. 26, 1934. No. 2,101,104.

Process for producing lubricating oils—Ulric B. Bray, Palos Verdes Estates, and Claude E. Swift, Glendale, Calif., assignor to Union Oil Co. Filed Feb. 23, 1932. No. 2,101,308.

Process and apparatus for conversion of hydrocarbon liquids and gases—Malcolm P. Youker, Bartlesville, Okla., assignor to Phillips Petroleum Co. Filed Dec. 4, 1931. No. 2,101,485.

Solvent refining of mineral oil—James H. Grahame, Mount Vernon, N. Y., assignor to Texas Co. Filed Aug. 10, 1935. No. 2,101,497.

Hydrocarbon oil conversion—Jean D. Seguy, Chicago, Ill., assignor to Universal Oil Products Co. Filed July 5, 1932. No. 2,101,517.

Process for fractionation of petroleum oils—Ernest F. Engelke, Camden, N. J., assignor to Power Patents Co., Jersey City, N. J. Filed July 30, 1930. No. 2,101,643.

Method of cracking hydrocarbon oils—Hermann C. Schutt, North Tarrytown, N. Y., assignor to Gyro Process Co. Filed Oct. 29, 1934. No. 2,101,800.

MISCELLANEOUS

Production of mercaptans — Raymond Reuter, Upper Aetna Lake, Medford Lakes, N. J., and Frank L. Gaus, Philadelphia, Pa., assignors to Atlantic Refining Co. Filed Feb. 15, 1935. No. 2,101,096.

Lubricating oils—Joseph Cole, Whiting, Ind., assignor to Sinclair Refining Co. Filed Sept. 30, 1936. No. 2,101,241.

Method of lubricating bearing surfaces—William W. Weinrich, Pittsburgh, Pa., assignor to Gulf Research & Development Co. Filed Nov. 12, 1935. No. 2,101,632.

Process and product relating to unsaturated xanthates, and xanthates of unsaturated secondary alcohols and process for preparation—Herbert P. A. Groll, Berkeley, Calif., assignor to Shell Development Co. Filed Jan. 30, 1937, and Feb. 27, 1937. Nos. 2,101,648 and 2,101,649.

Liquid dispensing apparatus—William M. Carroll, Fort Wayne, Ind., assignor to S. F. Bowser & Co. Filed Feb. 16, 1935. No. 2,101,806.

December 14, 1937

REFINING

Manufacture of motor fuels—Vladimir Ipatieff and Raymond E. Schaad, Chicago, Ill., assignors to Universal Oil Products Co. Filed Apr. 23, 1936. No. 2,101,857.

Method of separating emulsions of oil-in-water type—William Woelflin, Long Beach, Calif., assignor to Petroleum Rectifying Co. Filed June 16, 1936. No. 2,102,051.

Treatment of hydrocarbons—Vladimir Ipatieff and Raymond E. Schaad, assignors to Universal Oil Products Co. Filed Apr. 19, 1935, and Feb. 24, 1936. Nos. 2,102,073 and 2,102,074.

Distillation of oil—David G. Brandt, Westfield, N. J., assignor to Power Paents Co., Jersey City, N. J. Filed Jan. 31, 1922. No. 2,102,234.

Cracking of hydrocarbon oils—Lyman C. Huff, Chicago, Ill., assignor to Universal Oil Products Co. Filed Feb. 26, 1930. No. 2,102,269.

Process for dewaxing hydrocarbon oils—Earl Petty, Hempstead, N. Y., assignor to Sun Oil Co. Filed Apr. 14, 1933. No. 2,102,334.

Process for reactivation of spent clay—George H. von Fuchs, Wood River, Ill., assignor to Shell Development Co. Filed Apr. 15, 1936. No. 2,102,341.

Apparatus for treating hydrocarbon oils—Charles W. Stratford, Kansas City, Mo., assignor to Stratford Development Corp., same place. Filed Mar. 27, 1935. No. 2,102,548.

When buying gasoline . . .

—it is essential to procure a product adaptable to weather conditions as well as high anti-knock value.

All materials supplied by "Berry's" are made with a specified distillation range suitable for instant starting and maximum mileage.

We offer products from a 50 to 70 C. F. R. Octane;—shipments originating from either our Ocean Terminals or Pennsylvania refineries. We solicit your inquiries on any grade you might desire.

JAMES B. BERRY SONS' CO., INC. OIL CITY, PA.
Branch Offices: New York City; Chicago, Ill.; Boston, Mass.; Philadelphia, Pa.; Houston, Texas; London, England; Hamburg, Germany; The Hague, Holland.
Refineries: Oil City, Pa.; Emlenton, Pa.; Farmer's Valley, Pa.; St. Mary's, W. Va.
Ocean Terminals: Baltimore, Md.; Tiverton, R. I.; Dorchester, Mass.; Carteret, N. J.; Edgewater, N. J.; Glastonbury, Conn.; Philadelphia, Pa.
Berry
A NAME TO REMEMBER

First prize winner in Sohio's window dressing contest for independent dealer stations. H. J. Drummer of Custar, O., achieved a fine symmetrical balance and neatness, combined with a deft use of crepe paper for a background

Window Display Contest Helped Accessory Sales

CLEVELAND

STANDARD OIL CO. (Ohio) has completed a window display contest, sponsored to stimulate sales of accessory merchandise, which awakened the interest of salaried attendants, dealers and lessees despite the wide differences among the stations in physical equipment and facilities for window displays.

So that all contestants would have as nearly an equal chance for prize money as possible, contestants were divided into three classes; salary-operators, dealers and lessees. This, of course, is the natural sales division of the stations. These three classes were not inter-competitive. Thus a dealer with a station eight years old could not complain of unfair competition in the contest from a new super-service station of the company.

The greatest response to the window display contest came from attendants at company-operated stations, although few of Sohio's sales divisions failed to secure considerable interest from all three types of operators. The interest in proper display of accessories aroused through the contest, incidentally, carried over well into the Christmas holiday gift sales season.

Object of the contest was to secure attractive displays of accessories at all types of stations by encouraging the artistic ingenuity of attendants and dealers. The contest was announced with a back page spread in the Progressive Dealer, Sohio merchandising newspaper for Standard dealers. It offered $500 in prizes for the winning window displays which contained four "must" merchandise items. Thus the widest possible latitude was granted to encourage originality of display, but prevented any window from winning that did not also contain merchandise sold in the service stations. A beautiful window selling no merchandise would, of course, be without profitable purpose.

"Make Your Windows Do Double Duty" headlined the contest announcement. It continued:

Sohio offers Dollars for Outstanding Window Displays
AND
Outstanding Window Displays offer Increased Sales

The contest announcement, self-explanatory, as addressed to dealers continued:

"Here's all you have to do!

"The state (Sohio's marketing territory is largely bounded by Ohio borders) has been divided into three classes: 1. Dealer, 2. Dealer Rented, and 3. Salaried Stations.

"Build your window display during the specified period (the contest was for two weeks), using the "MUST" items plus any others you desire, together with the layout or composition that appeals to you most. Near the end of the month a committee of three prominent local people, selected by your division management, will judge the outstanding display in each class. The division winner in each group will receive a $5 prize and become eligible to compete for the statewide honor and prize money — $50 for first place; $25 for second place; and $10 for third.

"The whole thing is simple — Build your display using the "MUST" items. Build it in any way you see fit. Local judges will determine local winners, and the successful contestant will have an 8 x 10 photo made of his window. Send this to: Editor, the Progressive Dealer, Cleveland, Ohio."

Could Foretell Popularity

Pictures of the four must items followed. They were anti-freeze, a defroster fan, a fog light and a car heater. Twenty-seven optional items were listed.

The amount of interest in the contest was determined in advance by requiring entrees to fill out a coupon printed at the bottom of the announcement.

"To complete your eligibility," the announcement read, "fill in, clip and give this coupon to your salesman or mail it to your division office at once. This will make absolutely certain that the judges consider your window.

Altogether there were 39 winners in Sohio's contest, nine received double prize money. Sohio has 13 sales divisions, covering an average of about five or six counties each. In each of the 13 divisions were three $5 winners: best dealer display; best dealer rented display and best display in a salaried station.

All 39 pictures were then sent to Cleveland to select the three top winners in each of the three classes: nine top winners in all.

Of these nine, three received $50

First prize winner for dealer rented stations in Standard of Ohio window display contest. The customers played a game with the window. In their search for the squirrels, ducks and owls camouflaged against the woodlike background, the customer eyes could not help but catch the accessories displayed

each as the best dealer, best dealer rented and best salaried station displays respectively. Three second prizes of $25 each were likewise awarded and three third prizes of $10 each.

The best lessee window submitted was created by Combs Brothers, dealers in Zanesville, O. The window reproduced a woodland scene, with thick foliage as a background. Leafed branches were sufficiently plentiful to form a background and half hide a variety of stuffed animals — owls, squirrels, coons and in addition automotive accessory items. Customers took considerable delight in discovering as many animals in the window as possible and, as their eyes combed the window, they could not help but see the accessories displayed.

A Bon Ami and water color comic, consisting of a happy service station attendant's head and pointing forefinger, gave a touch of brightness to the window. On the other window (the outlay was a double window display) in bold, but neat Bon Ami lettering was the legend: "Protect school children with Atlas Grip-Safe Tires." A tire or so was also to be found in the foliage display.

Misspelling Cost a Prize

Not all such woodland scenes were so successful, however. For example, a Cleveland division station had a station window display with a hunting dog as the principal feature. The dog, a pointer, was in at point position, his tail leading the eye directly to a number of accessory items contained in the window. Above the window was a banner reading, "Excellent Pointers for Holiday Gifts." Unfortunately for the designer of the display, however, both "excellent" and "pointer" had been misspelled.

Several ideas that are perhaps adaptable for wider use were learned by the company from the entrees in the window decorating contest. A Delphos (O.) servicenter, for example, cleverly built a frame of light wood upon which sheets were tacked to form a translucent background for a Christmas-white display. Colored light illuminated the window which contained, of course, merchandise sold at the station.

A variety of achievements with crepe paper were visible as backgrounds in a number of entries.

Proportionately to their numbers, independent dealers were less responsive to the contest than salaried employes in company stations. This experience of the statewide merchandising division corroborates that of the Cleveland division, which reported it had found that some merchandising schemes were successful only in the servicenters.

It was partially due to this difference in possibilities that Sohio divided the contestants into three classes. Incidentally, a number of letters accompanying the entry photographs of the displays explained a lot of local difficulties. These letters were not shown to the judges, but the pictures were judged solely on their appeal as seen.

Royalty Oil Bids

WASHINGTON—Bids will be opened here on Feb. 28 for the sale of royalty oil accruing to the United States from leases on government land in the Lance Creek oil field, Wyoming, for a period of one, three or five years, beginning April 1, the Interior Department said today. More detailed information may be obtained from the director of the Geological Survey, Interior Department, Washington, D. C.

Aircraft Increasing

WASHINGTON—There were 17,681 pilots and 9152 aircraft holding active Commerce Dept. certificates on Jan. 1, the Bureau of Air Commerce announces. On Jan. 1, 1937, there were 15,952 certificated pilots and 7424 certificated aircraft.

First prize winner in window display contest for company-operated stations. Attendants at the Main Street Servicenter, Shelby, O., were able to form a background to the window display with crepe paper, without robbing the station of natural light through the window

Your Key to GREATER PROFITS in 1938

NATIONAL PETROLEUM NEWS is the key that will unlock greater profits in 1938 for every service station owner and manager. During the past year NPN carried 121 articles on *merchandising* at the service station. These are actual experiences of station owners which brought them increased profits thru the sale of accessories and services to the motorist. Here are some typical articles:

- Sells 2 carloads of tires in 6 stations (Wyaconda, Mo.)
- One-stop station sells tires to truckers at rate of $100 a month in town of 750 people.
- 25% Ahead, and still 2 months to go. (Bismark, N. D.)
- Greets customers by name—builds repeat business.
- $10 daily quota from lube lifts, oils and car cleaning to meet expenses. (Quincy, Ill.)
- Helping stations to sell—demonstration with magnet brings oil changes. (Crafton, Pa.)

Are you posted on recent developments to regulate retail marketing? For example:

- 16 states require price posting on or near dispensing equipment.
- Chain store tax laws in effect in 22 states, but service stations are exempt in all but 7.
- 3 states require license tax on pumps.
- 8 states require grading of gasoline sold within their limits.

PROTECT YOURSELF! The future of gasoline retailing has never been tied up so closely with current developments as today. What happens *this week*, or next, may vitally affect your own business. Prompt, accurate news and interpretation of what is going on is more essential to you TODAY than ever before.

Send your subscription for the next 52 weeks NOW.

---CLIP AND MAIL---

NATIONAL PETROLEUM NEWS
Penton Bldg., Cleveland, Ohio Date_____

Enter my subscription to NATIONAL PETROLEUM NEWS for the next 52 weeks. Enclosed is check for $3.00 (Canada $4.00; Foreign $4.50).

NAME_____

St. Box_____ Position_____

City-State_____ Company_____

TRADEMARKS

The following are trademark applications pertinent to our field pending in the United States Patent office which have been passed for publication and are in line for early registration unless opposition is filed promptly. For further information address National Trade-Mark Company, Munsey Building, Washington, D. C., trademark specialists.

As an additional service feature to its readers, this journal gladly offers to them an advance search free of charge on any mark they may contemplate adopting or registering. You may communicate with the Editor of this Department, or send your inquiry direct to the National Trade-Mark Company, stating that you are a reader of this journal.

Published Dec. 7, 1937

LUBRID ZOL. Ser. No. 397,583. The Lubri-Zol Corporation, Cleveland, O., and Wickliffe, O. Filed Sept. 20, 1937.

For lubricating oils and greases, lubricating oil compounds and motor lubricating oils, particularly for diesel engines.

TESTONE. Ser. No. 398,494. Samuel Rosenberg, doing business as Templar Products Company, New York City. Filed Oct. 14, 1937.

For anti-freezing solution for radiators.

Fun-L-Pak. Ser. No. 398,131. Southwest Grease & Oil Company, Wichita, Kan. Filed Oct. 4, 1937.

For lubrication grease.

LEADOLENE. Ser. No. 386,400. The Brooks Oil Company, Cleveland, O. Filed Dec. 7, 1936.

For lubricating grease.

A Note to . . .

Refiners, Brokers, Equipment Manufacturers

and others desirous of contacting the jobber trade in Wisconsin.

Off the Press Feb. 15th . . .

The Association's 1938 Gallonage Booklet containing the official record of all in-shipments of tank cars of gasoline by all tank car marketers and consumers for Wisconsin for 1937-1936-1935.

In Addition . . .

To the names and locations of all companies operating in Wisconsin and their gallonage for each of the past three years, the 1938 Gallonage Booklet will also list the brand of gasoline of each company alphabetically.

Prices of these complete and authentic booklets are:

Single copy each..	$15.
Five copies, each..	8.50
Ten or more copies, each.....	5.

An Associate membership in this Association will bring you, among other things—

An up-to-date- mailing list, corrected regularly. In-shipments Statistics-showing inspected products received by all companies - issued monthly and consolidated yearly.

AND MANY OTHER VALUABLE SERVICES

For Complete Information Address the

WISCONSIN PETROLEUM ASSOCIATION

329 East Wisconsin Avenue ★ Milwaukee, Wisconsin

Published Dec. 14, 1937

S V O and word MOTOR, "MOTOR" inside the "V." Ser. No. 393,459. John Alexander Waer, Los Angeles, Calif. Filed May 29, 1937.

For canned oils and greases for automobiles.

OILOY. Ser. No. 396,584. Universal Motor Oils Co., Inc., Wichita, Kan. Filed Aug. 19, 1937.

For lubricating oils, lubricating greases and motor fuel oil, and gasoline.

NINE POINT, and fanciful design. Ser. No. 398,353. Louis M. Goldman, doing business as Lou Bob Co., Chicago, Ill. Filed Oct. 11, 1937.

For lubricating oils.

SUPERFLO. Ser. No. 399,354. Hall Hardware Co., Minneapolis, Minn. Filed Nov. 5, 1937.

For lubricating oils and greases.

* * *

Published Dec. 21, 1937

RE-KO. Ser. No. 398,569. Dye-Col Products, Inc., New York City. Filed Oct. 16, 1937.

For fungicides.

HI-O-FILM. Ser. No. 398,941. Southport Petroleum Company, Kilgore, Tex. Filed Oct. 25, 1937.

For lubricating oil.

LARGE "M" and letters "P.E.CO" with design. Ser. No. 397,722. Pittsburgh Equitable Meter Co., Pittsburgh, Pa. Filed Sept. 23, 1937.

For meters for the measurement of water, oils and greases.

* * *

Published Dec. 28, 1937

PICTURE OF WINGED HORSE. Ser. No. 398,693. Socony-Vacuum Oil Co., Inc., New York City. Filed Oct. 19, 1937.

For lubricating oils and petroleum engine fuels.

* * *

Published Jan. 4, 1938

LUBELINER. Ser. No. 397,388. Standard Oil Company of California, Wilmington, Del., and San Francisco. Filed Sept. 13, 1937.

For lubricating oil dispensing equipment consisting of portable metal tanks associated with pumps or other delivery devices.

AUTO PORT. Ser. No. 397,468. John Barnes, Milwaukee, Wis. Filed Sept. 16, 1937.

For gasoline, lubricating oils, and lubricating greases.

"3 in" and design. Ser. No. 398,868. The A. S. Boyle Co., Jersey City, N. J. Filed Oct. 25, 1937.

For oil adapted for use as a lubricator, a preserver, or a cleanser for metal, wood, or leather.

"3 IN" and figure "1" and "3 IN ONE". Ser. No. 398,869. The A. S. Boyle Co., Jersey City, N. J. Filed Oct. 25, 1937.

For oil adapted for use as a lubricator, a preserver, or a cleanser for metal, wood, or leather.

"3 EN" and figure "1", and "3en UNO". Ser. No. 398,870. The A. S. Boyle Co., Jersey City, N. J. Filed Oct. 25, 1937.

For oil adapted for use as a lubricator, a preserver, or a cleanser for metal, wood, or leather.

Cuban Oil Control Is Proposed

N. P. N. News Bureau

WASHINGTON, Jan. 31.—In a special message to the Cuban Congress, the President of that country has recommended enactment of legislation empowering the government to control sales of gasoline on the island, according to a report received by the Commerce Department from its Havana office.

The recommendation was accompanied by a statement of a commission which the president appointed some time ago to study sale of gasoline in Cuba.

The commission's report pointed out that the investigators believe gasoline companies in Cuba are acting in conjunction, and that special benefits are obtained by one of the companies, due to what is considered its monopoly for the sale of refined products in Cuba, the report stated. The name of the company was not made public.

It was pointed out that the Cuban government is not in a position, due to lack of technical equipment, to determine the octane range of gasoline sold on the island, and the report added that the commission considers the cost of distribution in Cuba excessive when compared with the cost in American cities of the same population as that of Havana, and with refineries located nearby.

The filling station price of gasoline in Havana on Oct. 10, 1937, latest date for which figures are available, was 28 cents a gallon for regular gasoline, and 30 cents a gallon for premium, of which 16.6 cents per gallon were federal import taxes. This brings the price of gasoline at filling stations in the city, exclusive of tax, to less than 12 cents for regular and less than 14 cents for premium.

Elect La. Oil Man Head Of Commerce Group

N. P. N. News Bureau

MONROE, La., Feb. 7.—Willis H. Anders, sales manager for the Columbian Gasoline Corp., has been elected president of the Chamber of Commerce of Monroe and West Monroe. The Monroe News Star, in reporting the election stated:

"The selection of Mr. Anders as president was regarded as specially fortunate. He is a native of Ouachita parish, being a member of an old and prominent north Louisiana family. He was educated at Louisiana State University . . . for some 15 years he has been sales manager for the Columbian Gasoline Corp. . . . Since 1921 he has served on either the junior or senior board of the Chamber of Commerce and has served as president of the junior board."

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Build yourself sound goodwill by marketing the world's best grade motor oil under your own name. Our refinery is equipped to pack and seal a variety of oils—all refined from 100% pure Pennsylvania grade crude—in jobbers' own private brand cans. • Write today for prices and for information on Freedom brands available for exclusive marketing.

THE FREEDOM OIL WORKS CO. FREEDOM, PA.

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GENERAL STEEL PLATE CONSTRUCTION ★ GRAVER TANKS WATER CONDITIONING EQUIPMENT

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"When To Change Crankcase Oil" Dependent Upon Supervision

NEW YORK

THOSE extremely temperamental subjects of oil changes, oil filters, and fleet maintenance adequately filled the evening when the Metropolitan Section of the Society of Automotive Engineers met here Jan. 24 for a symposium on lubrication.

On the subject of "How Often Should Crankcase Oil Be Changed", opinions of oil men, fleet operators and filter manufacturers among those present ranged all the way from every 50 miles to every 18,000 miles.

George A. Round, Socony-Vacuum Oil Co., whose job on the program was to uphold the oil industry's views in the matter, agreed that each operation must have individual study to determine the most economical oil change periods, which in some instances should be every 50 miles, in others 2000 miles or more if operating conditions, engine, oil inspections and tests so indicated.

The type of maintenance was said to be one of the most important factors in this matter. Where extremely close supervision is found practical, conditions may be made most favorable to extended oil life but in the many instances where oil analysis and other close tests are impractical, the safer procedure is more frequent oil changes, he said.

In the discussion on filters, led by W. R. Graham, Motor Improvements, Inc., and Chase Donaldson, Briggs Clarifier Co., it was generally agreed that filters have a place in motor car lubrication, but that they cannot be called a "cure-all".

Round pointed out that it is impractical to employ filters large enough to handle the large percentage of water dilution generally found in used oil. This was generally agreed by manufacturers representatives present at the meeting.

Another limitation of filters was said to be their removal of addition agents now coming into use to improve lubricating oil characteristics. Because of the lack of correlation between laboratory and road tests of filters a need was expressed for development of a standard laboratory test for filters.

Several contaminants can be handled by oil filters, however, it was agreed by Round. In his list of contaminants he approved the use of filters for removing soot, lead salts, fuel ends, dust, metal particles, and oil decomposition products.

Each operator of a fleet of buses, trucks or motor cars is faced with the necessity of developing his own most suitable and economical program of lubrication and maintenance, A. George W. Brown, told members of the Metropolitan section.

Brown, who is equipment engineer for Jamaica Buses, Inc., is now operating a fleet of 59 buses on a schedule of crankcase oil changes at 18,000-mile intervals. He is using a cheap shop-made oil filter element which is changed every 6000 miles and finds his oil in relatively good condition at the end of 18,000 miles service.

These results have been confirmed not only by oil appearance but by a systematic inspection of crankcase interior, piston removal for inspection of rings, ring freedom, carbon deposits, wear measurement, and oil samples for laboratory test, according to Brown.

Results of these inspections showed "positively clean crankcase interiors with a complete absence of sludge, all rings free and ring grooves clean, minimum carbon deposits, minimum wear less than 0.001 inch for 10,000 miles of operation," he stated.

In spite of this record of service it is still the intention of Brown "to offset some of these costs by a reduction in oil consumption, elimination of labor for frequent filter element change, by procuring at some reasonable cost some filter or cleaner unit that will give extended use or mileage of service, before it again becomes necessary for material and labor charges."

Five fundamental factors have been found to be affected by the many variables in engine design which effect the selection of the correct grade of oil, it was brought out in Brown's talk. These are operating temperature, oil distribution, piston ring seal, carbon sensitiveness and freedom from oxidation. The first controls the extent of fluidity or thinning out during operation and the second is concerned with free flow in cold weather and in pressure systems, one partially balancing the other. A good viscosity at all temperatures means to Brown, without expressing it in terms of viscosity index, fluidity in coldest weather and an average minimum viscosity not lower than 37 Saybolt seconds at 350 degrees Fahr.

Failure of an oil to seal the piston rings he stated he felt to be a serious detriment to satisfactory engine performance, particularly wtih slow speed engines. Nor can an engine perform properly when carbon accumulates, which occurs when more oil passes the pistons than can be burned up by the fuel charge. Residual carbon, also found to be a most harmful property, was said to be invariably found in poorly refined oil.

Intelligent discussion of lubrication problems in the language of the maintenance man is gladly welcomed from lubrication sales engineers by Jamaica Buses' maintenance department but not by those who simply "expound the virtues of their own products", Brown stated. Men who can keep up-to-date on transportation lubricating problems, men who can present a refreshing and enlightened outside point of view, and who are fact-finders first, oil sales engineers afterwards, perform a truly useful function of our business," he said.

"I personally believe that one of the best indications of progressiveness on the part of the refiners lies in the willingness of its general executives and engineering personnel to come into frequent contact with the bus operator who spends money for their products", he continued.

"When our plans have reached a satisfactory state, and before proceeding with the experiment on several buses, we will confer with certain lubricating engineers for their opinion and advice." Past experiences in relieving lubrication problems were recalled in his talk, such as the introduction of air filters, elimination of gum in gasoline, and of gum-forming constituents in motor oil. Some of the less fortunate experiments with lubrication practice were also recalled as breeders of caution in lubrication studies.

While convinced that attainment of satisfactory results with any oils requires considerable service testing, Brown said he was fully convinced that "we have at our disposal oils that will fit any type of service or requirement."

Cleanliness of lubricating oil is still

Dewey Named Head Oil Burner Institute

Frank H. Dewey, new president of Oil Burner Institute, is general manager of the air-conditioning division of Gar Wood Industries, Inc., Detroit

possible at 18,000 miles of operation, Brown said, but he stated that does not answer the question as to what is the most economical period at which to change crankcase oil. To date, tests have been made on practically every make of filter by his company. Each has been found to have some good or bad points and none has been completely satisfactory, primarily from an initial and replacement of element cost point of view.

None of the replacement filter elements so far tested have shown superiority in any way over a simple element made in the company's own shops, Brown said. These consist of long fiber cotton waste from a filter manufacturer, hosiery material for the bags, the total cost for materials and labor to make and install being approximately 23 cents per unit.

One of the interesting observations Brown made at the meeting in connection with long use of oil was the necessity for increasing daily replenishments of oil after 10,000 miles of service if the same grade (S.A.E. 40) is used. If S.A.E. 50 is submitted, the daily additions went back to normal and also resulted in increased mileage per gallon of gasoline, he said.

A routine of inspection is followed by this company in which each bus has its oil and gasoline consumption checked and replenished, if necessary, every time a bus is returned to the garage, irrespective of mileage. Systematic checking of all component units for necessary lubrication is done on a daily rather than mileage basis. At 2000-mile intervals each bus is given a complete shop check of all units, engine oil condition, and other tests.

Better control of engine temperatures by recent installation of air-controlled shutters through a temperature control valve has had commendable results in improving fuel and lubricating oil economy as well as in better interior heating of buses, it was brought out. Radiator cooling of lubricating oil is also viewed with interest as to possibilities in reducing oil consumption.

Fort Worth A. P. I. Program Is Announced

FORT WORTH, Feb. 7. — Sessions on production engineering, production practice and drilling practice have been scheduled for the spring meeting of the southwestern district, American Petroleum Institute Division of Production, to be held at the Blackstone Hotel, Fort Worth, March 24 and 25, according to A. G. Levy, chairman of the southwestern district.

The following subjects will be discussed, but speakers have not yet been announced:

March 24, 10 A. M.
Production Engineering

Presiding: W. S. Morris, East Texas Engrg. Assn.
Associate Chairmen: C. E. Reistle, Jr., Humble Oil & Refining Co.
H. H. Hardison, Standard Oil Co. of Texas.
Developments in Cementing Practice Technique.
Pressure-Production Relationship — East Texas Field.
The Problem of Phase Relationships of High Pressure Condensate in Distillate Wells.

2 P. M., General Session

Presiding: A. G. Levy, Crown Central Petroleum Corp.
The Growth and Importance of Natural Gas in the Southwest.
Administration of the Oil Industry in New Mexico.

March 25, 9:30 A. M.
Production Practice

Presiding: W. E. Schoeneck, The Ohio Oil Co.
Associate Chairmen: L. A. Ogden, The Pure Oil Co.
H. M. Staggs, The Atlantic Refining Co.
Pipe for Transportation of Salt Water.
Selection of Casing Seats.
Well Treatment After Perforating.
Report of Nominating Committee and Election of Officers.

1:30 P. M., Drilling Practice

Presiding: E. A. Wahlstrom, Goldsmith Pool Engrg. Com.
Associate Chairmen: C. G. Staley, Lea County Proration Office.
W. A. Alexander, Shell Petroleum Corp.
Drilling and Production Practices in the Permian Basin.
Determination of Porous Zones By Drilling Rates.
Deep Drilling on the Gulf Coast.
Marine Operations on the Gulf Coast.

R. B. Kelly, The Pure Oil Co., Fort Worth, is chairman of the committee on arrangements.

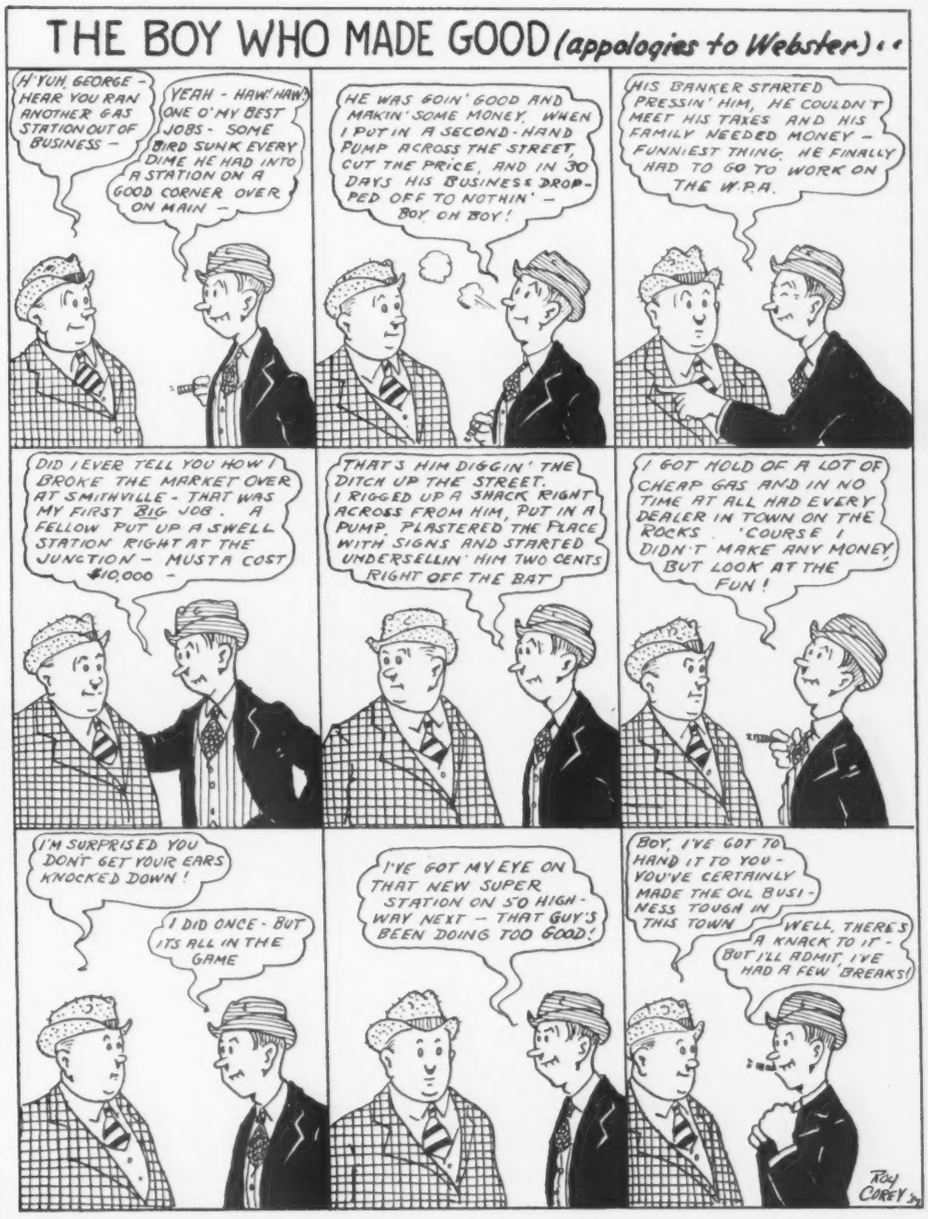
Special entertainment, to be announced later, will be on for the evening of March 24, and a dinner dance is scheduled for March 25.

To Assist McElroy

NEW YORK, Jan. 31.—R. B. Weston who has been in charge of the jobber department of Ethyl Gasoline Corp., has been appointed assistant to Paul E. McElroy, advertising manager. He will continue in charge of his former department also according to an announcement by J. C. Taylor, vice president.

Dunn Vacationing

CHICAGO, Feb. 7.—Harry Dunn, of Chicago, Harry P. Dunn Co., is leaving this week on a three weeks cruise in the West Indies.


THE BOY WHO MADE GOOD (appologies to Webster)..
H'YUH, GEORGE - HEAR YOU RAN ANOTHER GAS STATION OUT OF BUSINESS -
YEAH - HAW! HAW! ONE O'MY BEST JOBS - SOME BIRD SUNK EVERY DIME HE HAD INTO A STATION ON A GOOD CORNER OVER ON MAIN -
HE WAS GOIN' GOOD AND MAKIN' SOME MONEY, WHEN I PUT IN A SECOND-HAND PUMP ACROSS THE STREET, CUT THE PRICE, AND IN 30 DAYS HIS BUSINESS DROPPED OFF TO NOTHIN' - BOY, OH BOY!
HIS BANKER STARTED PRESSIN' HIM, HE COULDN'T MEET HIS TAXES AND HIS FAMILY NEEDED MONEY - FUNNIEST THING, HE FINALLY HAD TO GO TO WORK ON THE W.P.A.
DID I EVER TELL YOU HOW I BROKE THE MARKET OVER AT SMITHVILLE - THAT WAS MY FIRST BIG JOB. A FELLOW PUT UP A SWELL STATION RIGHT AT THE JUNCTION - MUSTA COST $10,000 -
THAT'S HIM DIGGIN' THE DITCH UP THE STREET. I RIGGED UP A SHACK RIGHT ACROSS FROM HIM, PUT IN A PUMP, PLASTERED THE PLACE WITH SIGNS AND STARTED UNDERSELLIN' HIM TWO CENTS RIGHT OFF THE BAT
I GOT HOLD OF A LOT OF CHEAP GAS AND IN NO TIME AT ALL HAD EVERY DEALER IN TOWN ON THE ROCKS 'COURSE I DIDN'T MAKE ANY MONEY, BUT LOOK AT THE FUN!
I'M SURPRISED YOU DON'T GET YOUR EARS KNOCKED DOWN!
I DID ONCE - BUT IT'S ALL IN THE GAME
I'VE GOT MY EYE ON THAT NEW SUPER STATION ON 50 HIGHWAY NEXT - THAT GUY'S BEEN DOING TOO GOOD!
BOY, I'VE GOT TO HAND IT TO YOU - YOU'VE CERTAINLY MADE THE OIL BUSINESS TOUGH IN THIS TOWN
WELL, THERE'S A KNACK TO IT - BUT I'LL ADMIT, I'VE HAD A FEW 'BREAKS!
ROY COREY

Oil Well Cementing and Shooting Are On A. P. I. Mid-Continent Program

DALLAS, Jan. 31.—Cementing problems, oil well shooting, trends in equipment and other improved methods of petroleum production, will be the principal topics of discussion at the spring meeting of the Mid-Continent district, Division of Production of the American Petroleum Institute, to be held Feb. 17 and 18 at the Herring Hotel, Amarillo, Tex.

Following greetings by the Mayor of Amarillo, Ross D. Rogers, the morning of Feb. 17, Col. E. O. Thompson, chairman of the Railroad Commission of Texas, will deliver the address of welcome. The program follows, with chairman and co-chairmen of each session given:

Feb. 17, 10 A. M.

Chairman: Van D. Bennett, Sunray Oil Co.
Co-Chairman: Dewey Jordan, The Atlantic Refg. Co.
Vocational Training in the Oil Industry, L. K. Covelle, State Supervisor, Trade and Industrial Education, Oklahoma.
Use of Hydraulic Pumps in Mid-Continent Field, J. F. Crawford, British American Oil Producing Co.

1:30 P. M.

Chairman: A. J. Holland, The Texas Co.
Co-Chairman: Ira M. King, E. H. Moore Co., Inc.
Unitization of Leases and Pressure Maintenance, E. O. Bennett, Continental Oil Co.
The How and Why of Oil Well Shooting, Paul F. Lewis, American Glycerin Co.
Sulphate-Resisting Cements for Oil-Well Cementing, Svend Rodam, Trinity Portland Cement Co.
Moving pictures in color on "Manufacture of Cement."

Feb. 18, 9:30 A. M.

Chairman: F. W. Floyd, The Carter Oil Co.
Co-Chairman: J. K. Ellis, Transwestern Oil Co.
Squeeze Cementing for Controlling Gas-Oil Ratios, C. P. Parsons, Halliburton Oil Well Cementing Co.
Application of Electrical Logging Methods to West Texas Problems, W. J. Gillingham and W. B. Steward, Schlumberger Oil Well Surveying Corp.
Accident Prevention in the Oil Industry, G. O. Lockwood, Cities Service Oil Co.
Report of Nominating Committee. Election of District Officers and Advisory Committee.

1:30 P. M.

Chairman: M. A. Sherwood, Shell Petroleum Corp.
Co-Chairman: N. M. Hutchinson, Cities Service Oil Co.
The Hazardous Use of Old Pressure Vessels in Oil Fields, G. Raymond, Black—Sivalls & Bryson, Inc.
Modern Trends in Rotary Equipment and Drilling, J. E. Brantly, Drilling and Exploration Co., Inc.
Practical Methods of Determining Productivity in Reservoirs on Leases by Bottom Hole Pressures and Core Analysis, W. S. Walls, Phillips Petroleum Co.

A dance and floor show the evening of Feb. 17 at the Nat has been scheduled, and a stag banquet and show for the evening of the 18th.

Chairmen of the various convention committees, under the general chairmanship of C. E. Sturdevant, Phillips Petroleum Co., are: program, C. A. Daniels, Phillips Petroleum Co., Amarillo; registration, R. C. Kay, independent operator of Amarillo; publicity, N. D. Bartlett, News-Globe, Amarillo; and entertainment, Mason King, News-Globe, Amarillo.

Chicago Oil Men To Meet

CHICAGO, Feb. 7.—Prof. M. Palye, of the University of Chicago, will speak at the Feb. 17 meeting of the Chicago Oil Men's Club on "The American Point of View on the Far Eastern Situation." In recent weeks the club has had speakers on the Japanese and on the Chinese viewpoints.

S. Loy Bissell Dies

CLEVELAND, Feb. 7.—S. Loy Bissell, 61, industrial sales engineer with the Standard Oil Co. (Ohio) for 35 years, died last week at his Aurora (O.) home after an illness of six weeks.

After his graduation from Western Reserve University here, Mr. Bissell was employed in the Mahoning Valley steel mills. He was a plant engineer for Brown-Bonnell Steel Co. at Youngstown, O., when he resigned to join Sohio. He was known in almost every large oil consuming plant in Sohio's territory.

Plan Bridge Party

CHICAGO, Feb. 7.—The Chicago Oil Men's Club first bridge party will be on the evening of Feb. 10 at the Auditorium hotel. The party will begin with dinner, followed by auction and contract bridge.

D. C. Gas Tax

WASHINGTON—The District of Columbia collected $220,166.71 from its 2-cents-a-gallon gasoline tax in December, compared with collections of $208,930.03 in December, 1936, according to the tax office.

Enforced Oil Storage

WASHINGTON — A proposal to require all importers of gasoline and motor fuel oils in Sweden to maintain stocks on hand at all times equivalent to at least 30 per cent of the previous year's consumption, much of it in bombproof storage underground, has been presented that country's parliament by a national defense investigating committee, it is reported to the Commerce Department by its Stockholm office.

If adopted as a national defense measure, this proposal would about double the present storage capacity in Sweden, making it about 400,000 cubic meters (a little more than 2,500,000 barrels). Blasting for underground storage would be financed by the government.

Oil and Highways

(*Continued from page* 30)

secondary or farm-to-market roads, forest roads and trails, national park highways and roads through public lands.

"A cardinal principle embodied in the Hayden-Cartwright highway act 1934 is in substance: 'Funds collected from highway users should be plowed back and applied to highway construction and maintenance.'

U. S. HIGHWAY STATISTICS

Gathered at Road Builders Show in Cleveland, Jan. 17-21

Total main highways.	440,000
Total feeder roads...	3,000,000
Total road mileage..	3,440,000
Total number motor vehicles	30,000,000
Persons killed on highways 1937	40,000
*Total federal appropriations 1938..	$238,000,000
Highway diversion total	$120,000,000

* This figure does not include expenditures by state, county or local governments, which bring the total to several times the above amount.

"That policy was expressed as a fundamental procedure for the states to follow in the expenditure of funds collected from highway users.

"Now—is there any justification for the federal government not practicing a policy which it says the states must follow?"

"It appears that diversion was first conceived as a brain child of doubtful parentage in about 1916," Van Wagoner said. "The infant amounted to only about $700,000 for the entire nation, but . . in 1936 the motorist saw nearly $170,000,000 of their tax dollars dissipated for purposes other than highways.

"Today 35 states permit diversion. . . Approximately 12 per cent of the motorist's tax dollar creeps into these diversion channels. In addition, 22 states have a general sales tax which levies a further burden upon the ever-patient motorist.

"Can the motorist afford to relinquish the benefits due him from the revenue created from his tax dollar? I think not. Is the American highway system overbuilt? I think not.

"If you doubt me, I wonder what would be the answer of the families of nearly 38,000 people killed in automobile accidents in 1936?"

Markets

At A Glance . . .

MID-WESTERN: Refinery shutdowns slow gasoline market.

PENNSYLVANIA: Motor oil moves; high-octane down 0.25 cent.

GULF COAST: Gasoline tighter; gas oil at standstill.

EASTERN: Gasoline continues unsettled.

MID-CONTINENT: Gasoline steadiness attributed to shutdowns.

CALIFORNIA: Tanker of gasoline en route from Texas Gulf.

Mid-Western

N. P. N. News Bureau

CHICAGO, Feb. 7. — All grades of gasoline in the Mid-western market were tending toward scarcity during the past week, sellers generally reported. A few jobbers said they were withdrawing from active participation in the gasoline spot market in order to build up their inventories for early spring shipment of third grade and regular gasoline in particular. Sellers attributed the slowness of the gasoline market to the recent shutdown of several southwestern refineries. Quotation on 64-66, 375, e.p. gasoline was increased ¼c to 4.50c.

Majority of Michigan refiners reported good movement of straight run gasoline during the past week. Several refiners stated they were behind in shipment on this grade. Higher octane gasoline was reported to be in fair movement with prices generally unchanged.

Kerosine continued to hold up well during the past week, Chicago marketers reported. Inquiries for range oil were numerous, however, demand slackened during latter part of week with milder weather becoming more prevalent, sellers stated. A considerable portion of range oil was being shipped up to the northern sections of Wisconsin and Michigan, it was reported.

Michigan refiners reported good demand for kerosine with supplies becoming freer as week drew to a close. Quotations generally were 5.55-5.80.

N. P. N. Refinery Index

The Refinery Index shown below is the calculated average return from refining a barrel of 36 gravity Mid-Continent crude into its various principal products at the current price of crude oil. The index indicates the following margins in cents per barrel between cost of crude and current selling price of products.

Date	Margin
Feb. 1	33.0
Month ago	32.8
Year ago	47.8

Pennsylvania

High Octane Down 0.25 Cent

CLEVELAND, Feb. 7. — Movement of most products was reported fairly steady in the western Pennsylvania refinery market the first week of February. Shipments for the most part were against contracts although open market demand for one or two items was moderately active.

High octane gasoline was down 0.25 cent in the lower field and wax generally was quoted 0.1 cent lower. Prices of other products were unchanged.

Some lower field refiners reported disturbing accumulations of high octane gasoline, and also increased competition from other refinery districts. They dropped their quotations for minimum 65 octane gasoline 0.25 cent in an effort to stimulate movement, they said.

Many refiners reduced their quotations for white crude scale wax 0.1 cent a pound and, at around 2.25 cents, they reported demand, particularly from exporters, had picked up considerably.

While kerosine and fuel oil were offered more freely, following an exceptionally tight market of several weeks' duration, refiners and resale agents alike said they were having no trouble in obtaining their current asking prices.

Movement of motor oils to the domestic trade has picked up to the point of being encouraging, refiners said. There was little demand for bright stock and neutral oils as such, however, they said. Shipments for export were heavy following the buying flurry late in January, but new export business was light, according to reports.

N. P. N. Gasoline Index

	Dealer T.w. Cents per	Tank Car gal.
Feb. 7	10.20	5.93
Month ago	10.19	5.98
Year ago	10.31	6.39

Dealer index is an average of "undivided" dealer prices, ex-tax, in 50 cities.

Tank car index is a weighted average of 12 wholesale markets for regular-grade gasoline.

Coastal

Export Gasoline Cargo Sold

N. P. N. News Bureau

NEW YORK, Feb. 7. — A cargo of approximately 60,000 barrels of 64-66, 375 end point gasoline for early March lifting was reported sold at 5 cents early in the week ended Feb. 5.

No other sales for export or domestic shipment were reported during the week.

Despite the sale of 375 end point gasoline at 5 cents reported early in the week, sellers here said that gasoline at the Gulf was becoming tighter. Refinery shut downs in East Texas as well as other Texas points and in the Mid-Continent were credited with improving the export gasoline market at the Gulf.

Gas oil came in for considerable attention from traders. One major supplier reported he was offering gas oil with a good diesel index at 4.125 cents, without takers early in the week. He later reduced his price to 4 cents and still reported no sales.

Current boat rates, sellers here reported, have resulted in virtually no gas or fuel oil being shipped in domestic trade.

Reports concerning Bunker C fuel oil varied considerably. Some reports here indicated that prices for this product were being shaded freely. Other traders said that the market for this oil was tight at 80 to 85 cents.

Eastern

Gasoline Unsettled

N. P. N. News Bureau

NEW YORK, Feb. 7.—Gasoline markets along the eastern seaboard continued somewhat unsettled the first week of February, traders reported.

Local retail disturbances continued to be reported at some seaboard points. This was especially true in the New York area and in northern New Jersey. The dealer price in one borough of New York City was 1.5 cents below other boroughs. Some major companies in northern New Jersey were quoting 1 cent below general quotations to dealer accounts.

Reports of gasoline being offered in tank cars and barges at 0.25 cent under general market quotations for shipment from New York harbor were reported as the week ended. Offerings at these prices, however, could not be

REFINERY TANK CAR MARKETS

All prices on this page are publisher's opinion of open market quotations or sales, for spot shipment (10 to 15 days). Prices in cents per gallon except heavy fuel oils in dollars per barrel, tank car lots, f.o.b. refineries in districts designated, except where otherwise noted. Inter-refinery and export prices not included, unless so stated in the respective markets. Federal, state or municipal taxes not included. Prices quoted apply on products made from legally produced crude. Unless otherwise noted, gasoline octane ratings are determined by C.F.R. Motor method, A.S.T.M. D-357-33T; and lubricating oil specifications determined according to A.S.T.M. methods, unless otherwise noted.

Gasoline *and* Naphtha

Prices Effective	Feb. 7	Jan. 31
OKLAHOMA		
U. S. Motor: (Octane Test L-3)		
62 oct. & below	4.00 – 4.25	4.00 – 4.25
63-66 oct.	4.375– 4.50	4.375– 4.50
67-69 oct.	4.625– 4.875	4.625– 4.875
70-72 oct.	4.875– 5.25	4.875– 5.25
60-62, 400 e.p.	(a)4.00 –4.25	(a)4.00 –4.25
64-66, 375 e.p.	(a)5.00 –5.125	(a)5.00 –5.125
68-70, 350-360 e.p.	(a)5.125–5.25	(a)5.125–5.25
WESTERN PENNA.		
Bradford-Warren:		
Motor gasoline:		
Min. 65 oct.	6.75 – 7.25	6.75 – 7.25
Other districts:		
54-56 naphtha	(a)4.50	(a)4.50
Motor gasoline:		
U. S. Motor (58-62°)	4.50 – 4.625	4.50 – 4.625
Min. 65 oct.	6.25 – 6.50	6.50 – 7.00
CENTRAL MICHIGAN (Prices f.o.b. Cent. Mich. refinery group basis, for shipment within Michigan. Shipments, however, may originate at plants outside Central group).		
Str.-Run Gasoline	(d)5.00 –5.50	(d)5.00 –5.50
64-66 octane gas.	7.75 – 8.00	7.75 – 8.00
68-70 octane gas.	7.75 –8.375	7.75 – 8.25
(d) Excluding Detroit shipment.		
CALIFORNIA (3c tax to be added to prices if used in state)		
U. S. Motor:		
54-58, for instate shipment	7.25 – 9.25	7.00 – 9.25
54-58, for outside state shipment	8.00 – 9.00	8.00 – 9.00
58-61, 375-400 e.p., 65 oct. & above	8.75 – 9.75	8.75 – 9.75
(c) **N. TEX.** (For shipment to Texas and N. Mex. destinations; Group 3 prices quoted on northern shipments)		
U. S. Motor: (Octane Test L-3)		
62 oct. & below	(a)4.50 –4.875	(a)4.50 –4.875
63-66 oct.	(a)5.00 –5.375	(a)5.00 –5.375
67-69 oct.	(a)5.375–5.75	(a)5.375–5.75
70-72 oct.	(a)5.625–6.00	(a)5.625–6.00
60-62, 400 e.p.	(a)4.625–4.875	(a)4.625–4.875
KANSAS (For Kansas destinations only)		
U. S. Motor: (Octane Test L-3)		
62 oct. & below	4.375– 4.50	4.375– 4.50
70-72 oct.	5.375– 5.50	5.375– 5.50
(c)**W. TEX.**		
U. S. Motor: (Octane Test L-3)		
62 oct. & below	4.625– 4.75	4.625– 4.75
63-66 oct.	5.125– 5.25	5.125– 5.25
67-69 oct.	5.50 – 5.625	5.50 – 5.625
70-72 oct.	5.875	5.875
(c)**E. TEX.**		
60-62, 400 e.p.	(a)4.00 –4.125	(a)4.00 –4.125
N. LA. (For shipment within La. & into Ark.)		
U. S. Motor: (Octane Test L-3)		
62 oct. & below	4.50	4.50 – 4.75
63-66 oct.	4.625	4.625– 4.875
67-69 oct.	5.00	5.00 – 5.25
70-72 oct.	5.50	5.50
ARKANSAS (For shipment within Ark. & into La.)		
U. S. Motor: (Octane Test L-3)		
62 octane & below	(b)4.50	(b)4.50
67-69 oct.	(b)5.00	(b)5.00
OHIO (Quotations of S. O. Ohio. Delivered anywhere in Ohio).		
U. S. Motor	7.625	7.625
Above 65 oct.	7.875	7.875

Natural Gasoline

(Prices are those to blenders on freight basis shown below. Shipments, however, may originate in other Mid-Continent manufacturing districts, such as Panhandle Texas, S. W. Texas or Kans.)

F.O.B. GROUP 3		
Grade 26-70	2.25 – 2.375	2.375
F.O.B. BRECKENRIDGE		
Grade 26-70	2.25	2.50
CALIFORNIA (F.o.b. plants in Los Angeles basin)		
75-85, 350-375 e.p. for blending	7.50 – 7.75	7.50 – 7.75

(a) Nominal.
(b) Only one refiner quoting.
(c) Refiners report they generally receive from 0.25c to 0.5c per gal. more for gasoline & kerosine for local or differential territory shipment.

Kerosine

Prices Effective	Feb. 7	Jan. 31
WESTERN PENNA.		
Bradford-Warren:		
45 w.w.	5.50 – 5.75	5.50 – 5.75
46 w.w.	5.625– 5.875	5.625– 5.875
47 w.w.	5.75 – 6.00	5.75 – 6.00
Other districts:		
45 w.w.	5.375– 5.50	5.375– 5.50
46 w.w.	5.50 – 5.625	5.50 – 5.625
47 w.w.	5.625– 5.75	5.625– 5.75
CENTRAL MIGHIGAN (Prices f.o.b. Cent. Mich. refinery group basis, for shipment within Michigan. Shipments, however, may originate at plants outside Central group.)		
47-49 w.w.	5.55 – 5.80	5.55 – 5.80
OKLAHOMA		
41-43	4.125– 4.50	4.125– 4.50
42-44 w.w.	4.25 – 4.625	4.25 – 4.625
KANSAS (For Kansas destinations only).		
41-43 w.w.	4.50 – 4.625	4.50 – 4.625
42-44 w.w.	4.625– 4.75	4.625– 4.75
(c)**N. TEX.** (For shipment to Texas and New Mexico destinations; Group 3 prices quoted on northern shipments).		
41-43 w.w.	4.50	4.50
(c)**E. TEX.**		
41-43 w.w.	(a)4.125	(a)4.125
N. LA. (For shipment within La. and into Ark.)		
41-43 w.w.	4.375– 4.50	4.50 – 4.625
ARK. (For shipment within Ark. and into La.).		
41-43 w.w.	(b)4.625	(b)4.625
CALIFORNIA		
40-43 w.w.	6.00 – 7.00	6.00 – 7.00

Gas *and* Fuel Oils

Prices Effective	Feb. 7	Jan. 31
WESTERN PENNA.		
Bradford-Warren:		
36-40	5.25 – 5.375	5.25 – 5.375
Other districts: (Excluding Pittsburgh District Prices).		
36-40	4.875– 5.00	4.875– 5.00
CENTRAL MICHIGAN (Prices f.o.b. Cent. Mich. refinery group basis, for shipment within Michigan. Shipments, however, may originate at plants outside Central group.)		
P.W. Distillate	5.25 – 5.50	5.25 – 5.50
No. 3 gas oil, Str.	4.625– 5.00	4.625– 5.00
U.G.I. gas oil	4.00 – 4.25	4.25 – 4.625
Fuel Oils (Vis. at 100):		
500-700 Vis.	2.25 – 2.75	2.25 – 2.75
300-500 Vis.	2.50 – 3.00	2.50 – 3.00
100-300 Vis.	3.25 – 3.375	3.25 – 3.375
OKLAHOMA		
No. 1 white	4.125– 4.25	4.125– 4.25
No. 1 straw	4.125	4.125
No. 2 straw	3.875– 4.00	3.875– 4.00
No. 2 dark	3.75 – 3.875	3.75 – 3.875
U. G. I. gas oil	(a)3.00 –3.375	(a)3.00 –3.375
28-30 zero	3.625– 3.75	3.625– 3.75
28-30	(b)$1.35	(b)$1.35
24-26	(b)$0.875-$0.925	(b)$0.875-$0.925
18-22	(a)$0.825-$0.875	(a)$0.825-$0.875
14-16	(a)$0.80 -$0.85	(a)$0.80 -$0.85
KANSAS (For Kans. destinations only).		
No. 1 p.w. fuel oil	4.375– 4.50	4.375– 4.50
10-14 fuel oil	$0.675	$0.675
N. TEX. (For shipment to Texas and N. Mex.; Group 3 prices quoted on northern shipments).		
No. 1 white	(a)4.25	(a)4.25
U. G. I. gas oil	2.75 – 2.875	2.75 – 2.875
24-26	$0.85 –$0.875	$0.85 –$0.875
18-22	$0.80 –$0.825	$0.80 –$0.825
N. LA. (For shipment within La. and into Ark.)		
No. 2	3.625– 3.75	3.625– 3.75
20-24	$1.10 –$1.15	$1.10 –$1.15
16-20	$0.95 –$1.00	$0.95 –$1.00
10-14	$0.80 –$0.85	$0.80 –$0.85
ARK. (For shipment within Ark. and into La.).		
No. 2	(b)4.00	(b)4.00
28-30 gas oil, zero	(b)3.75	(b)3.75
CALIFORNIA		
San Joaquin Valley:		
Heavy fuel	$0.65 –$0.85	$0.60 –$0.85
Light fuel	$0.85 –$0.95	$0.85 –$0.95
Diesel fuel (per gal.)	3.75 – 5.00	3.75 – 5.00
Stove dist. (per gal.)	4.00 – 7.00	4.00 – 7.00
Los Angeles:		
Heavy fuel	$0.70 –$1.00	$0.65 –$1.00
Light fuel	$0.85 –$1.10	$0.85 –$1.10
Diesel fuel (per gal.)	3.25 – 5.00	3.25 – 5.00
Stove dist. (per gal.)	3.50 – 7.00	3.50 – 7.00

Gas and Fuel Oils (Cont'd)

Prices Effective	Feb. 7	Jan. 31
San Francisco:		
Heavy fuel	$1.05	$1.05
Light fuel	$1.15	$1.15
Diesel fuel (per gal.)	5.50	5.50
Stove dist. (per gal.)	7.50	7.50

Note: All above heavy fuels meet Pacific specification 400; light fuel, spec. 300; Diesel fuels, spec. 200; and stove distillate, spec. 100.

Neutral Oils

WESTERN PENNA.

Viscous Neutrals (*Viscosity at 70° F.*)

200 Vis. (180 at 100°) No. 3 col., 420-425 fl.:		
0 p.t.	20.50 –21.00	20.50 –21.00
10 p.t.	19.50 –20.00	19.50 –20.00
15 p.t.	19.00 –19.50	19.00 –19.50
25 p.t.	17.00 –17.50	17.00 –17.50
180 Vis. (165 at 100) No. 3 col., 410-415 fl.:		
25 p.t.	16.00 –16.50	16.00 –16.50
150 Vis. (143 at 100) No. 3 col., 400-405 fl.:		
0 p.t.	17.50 –18.00	17.50 –18.00
10 p.t.	16.50 –17.00	16.50 –17.00
15 p.t.	16.00 –16.50	16.00 –16.50
25 p.t.	15.00 –15.50	15.00 –15.50

SOUTH TEXAS

Vis. Color		
Pale Oils: (*Vis. at 100° F.; p.t. 0*)		
100 No. 1½-2½	5.00 – 5.50	5.00 – 5.50
200 No. 2-3	6.50 – 7.00	6.75 – 7.25
300 No. 2-3	7.00 – 7.50	7.25 – 7.75
500 No. 2½-3½	8.00 – 8.50	8.25 – 8.75
750 No. 3-4	8.50 – 9.00	8.75 – 9.25
1200 No. 3-4	9.00 – 9.50	9.25 – 9.75
2000 No. 4	9.25 – 9.75	9.50 –10.00
Red Oils:		
200 No. 5-6	6.50 – 7.00	6.75 – 7.25
300 No. 5-6	7.00 – 7.50	7.25 – 7.75
500 No. 5-6	8.00 – 8.50	8.25 – 8.75
750 No. 5-6	8.50 – 9.00	8.75 – 9.25
1200 No. 5-6	9.00 – 9.50	9.25 – 9.75
2000 No. 5-6	9.25 – 9.75	9.50 –10.00

Note: South Texas red oil prices shown above cover oils with green cast; blue cast red oils are slightly lower in some cases.

MID-CONTINENT (Vis. at 100° F.; F.o.b. Tulsa basis).

Pale Oils: (0 to 10 P.P.) Vis. Color		
60-85—No. 2	5.50	5.50
86-110—No. 2	6.00	6.00
150—No. 3	9.00	9.00
180—No. 3	10.00	10.00
200—No. 3	10.50	10.50
250—No. 3	11.50	11.50
280—No. 3	12.50	12.50
300—No. 3	13.00	13.00
Red Oils:		
180—No. 5	9.00	9.00
200—No. 5	9.50	9.50
250—No. 5	10.50	10.50
280—No. 5	11.50	11.50
300—No. 5	11.75	11.75

Note: Viscous oils, 15-25 p.p., generally are quoted 0.5c under 0-10 p.p. oils. Non-viscous oils, 15-25 p.p., generally are quoted 0.25c under 0-10 p.p. oils. Viscous oils (150-300 vis.), No. 4 color, generally are quoted 0.5c above No. 5 color oils.

CHICAGO (Vis. at 100° F.)

Pale Oils (c)0 to 10 p.p.: Vis. Color		
60-85—No. 2	7.25	7.25
86-110—No. 2	7.75	7.75
150—No. 3	10.00	10.00
180—No. 3	11.00	11.00
200—No. 3	11.50	11.50
250—No. 3	12.50	12.50
Red Oils:		
180—No. 5	10.00	10.00
200—No. 5	10.50	10.50
250—No. 5	11.50	11.50
280—No. 5	12.50	12.50
300—No. 5	12.75	12.75

(c) Viscous oils, 15 to 30 p.p. are quoted 0.5c lower, 60-85 and 86-110 No. 2 non-viscous oils, 15 to 30 p.p., are quoted 0.25c lower. To obtain delivered prices in Chicago, add 0.25c per gal.

Cylinder Stocks

MID-CONTINENT (F.o.b. Tulsa basis).

Bright Stocks:		
190-200 Vis. at 210° D	19.00	19.00
150-160 Vis. at 210° D:		
0 to 10 p.p.	16.00	16.00
10 to 25 p.p.	15.00 –15.50	15.00 –15.50
25 to 40 p.p.	15.00	15.00
150-160 vis. at 210° F.	15.00	15.00

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GENERAL OFFICES - - FINDLAY, OHIO

ROBINSON, ILLINOIS TULSA, OKLAHOMA FT. WORTH, TEXAS

confirmed from sellers active in this district.

Occasional reports of lower priced tank car offerings were reported in the Baltimore market, but these also could not be confirmed.

Distributors reported consumption of gasoline still was below expectations. Some blamed the general business recession, while others said that factors of license renewal and road conditions have held down gasoline consumption.

Mid-Continent

N. P. N. News Bureau

TULSA, Feb. 7. — Steadiness in the Mid-Continent gasoline market was reported by majority of traders the first week in February. This was attributed to improved statistical position of independent refiners. Plant shut downs and reduced refinery operations have brought gasoline output more nearly in line with consumption, it was said. With offerings more nearly in line with demand, brokers were reported inquiring for new supply sources. Prices appeared steady at generally unchanged prices.

Purchase of 285 cars of East Texas 400 e.p. gasoline for coastwise shipment last week relieved the situation in that district, traders said.

Grade 26-70 natural gasoline prices were off 0.125 to 0.25 cent last week. Production still outdistanced demand, despite reduced output in Texas due to Sunday shutdown. Manufacturers estimated the Texas Sunday shutdown has resulted in an eight to thirteen per cent reduction in natural output. One manufacturer said this reduction was about equal to production at new plants built last year; but due to lag in export and coastwise demand, shipments were falling short of production. Natural gasoline was reported being pushed into the open market by manufacturers who normally are not an open market factor.

Quotations for South Texas lubes were off 0.25 cent. Shipments were light; competition keen, according to most sellers. Little change noted in Mid-Continent lube prices. Mid-Continent wax, for domestic shipment f.o.b. plant, dropped to 2.50 to 2.75 cents.

Kerosine was in good shape. Some inter-refinery inquiries for this product were reported.

California

N. P. N. News Bureau

LOS ANGELES, Feb. 5. — Reports on the west coast late in the week that an 80,000-barrel tanker had been loaded at Houston with gasoline for Pacific Coast consumption, injected a new question-mark into the local marketing picture. Available details of this shipment appear elsewhere in this issue of NATIONAL PETROLEUM NEWS.

(*Continued on page* 60)

Fuel Oil . . . . .

N. P. N. News Bureau

CHICAGO, Feb. 7. — Brisk inquiries for burner fuels were reported by Chicago sellers early last week. One seller in particular reported movement of 18 cars of p.w. distillate. Freer offerings of domestic burner fuels were reported later in the week, however, as unsettled weather was cited as factor in declining movement. The variable temperatures during past few weeks have led many sellers to abandon fear of shortage in their storage for rest of active burner fuel season, it was said.

A number of Michigan refiners said they were unable to meet the demand for light fuels. Inquiries continued good throughout the week refiners stated, while prices were generally firm and steady.

Heavy fuels continued to be freely available in the Chicago section the past week, it was generally reported. Buying was light, sellers said, with no immediate outlook for appreciable demand from industrial centers.

Michigan refiners also reported burdensome stocks of heavy fuels. One comparatively small refiner reported drop-off in shipment of 4 cars of heavy fuels last week, to a large automotive plant due to curtailed operations.

* * *

NEW YORK, Feb. 7. — Relatively mild weather along the eastern seaboard has resulted in a spotty fuel oil market, sellers reported.

Some shading of tank car and barge quotations was reported, but general market quotations were unchanged during the first week of February.

Industrial fuels were inactive, sellers said, with the current business recession being credited with the lack of movement.

* * *

TULSA, Feb. 7. — Light fuel oil shipments continued to move from Mid-Continent plants at a fast rate. Consumption in the north and middlewest was fair and since buyers have been operating on a hand-to-mouth basis, cold snap stimulated purchases.

No. 1 oil was plentiful and some price shading was reported on products with high pour test. Nos. 2 and 3 oils were closely held. Prices were steady.

Stocks of heavy fuel appeared topheavy as additions to storage were reported by several refiners. Railroads, in many cases, were taking only the minimum specified in their contracts; and with industrial demand light, excess supplies were reported.

Pa. Refinery Lubricating Oil Inventory

*(Issued as of Jan. 27 by National Petroleum Assoc.)**

	Gallons
1. **Raw Long Residuum** (Including all raw long residuum below, and not salable, as 600 fire)	1,295,293
2. **600 Steam Refined** (Includes all steam refined stock commonly sold or used as 600 and as raw material for bright stocks)	8,620,920
3. **Other Steam Refined** (Not included in 1 and 2 above)	6,237,791
4. **Finished Dewaxed Long Res.**	2,909,384
5. **Bright Stock** (Does not include any material reported in 4, above)	18,288,929
6. **Viscous Neutral,** below 180 vis. but not below 142 vis. @ 100	7,167,935
7. **Viscous Neutral,** 180 vis@ 100 and above	9,758,862

*Date on above table last week's issue erroneously carried; should have been Jan. 20.

TANK WAGON MARKETS, HEATING OILS

Prices in Effect Feb. 7, 1938

Following are tank wagon prices of various grades of heating oil at the points shown in various territories. Prices are in cents per gallon.

	No. 1	No. 2	No. 3	No. 4
S. O. NEW JERSEY				
Newark, N. J.	*	7.00	7.00	7.00
Atlantic City, N. J.	*	7.00	7.00	7.00
Baltimore, Md.	8.00	7.00	7.00	7.00
Washington, D. C.	8.50	7.75	7.75	7.75
SOCONY-VACUUM OIL CO. INC.				
(S. O. New York Division)				
New York City	*	7.50	7.50	7.50
Albany, N. Y.	*	7.50	7.50	7.50
Rochester, N. Y.	*	7.50	7.50	7.50
Boston, Mass.	*	7.00	7.00	7.00
Bangor, Me.	*	8.00	8.00	8.00
Manchester, N. H.	*	7.50	7.50	7.50
Burlington, Vt.	*	8.00	8.00	8.00
Hartford, Conn.	*	7.00	7.00	7.00
New Haven, Conn.	*	7.00	7.00	7.00
Providence, R. I.	*	7.00	7.00	7.00

*Prices for No. 1 fuel in S. O. New Jersey and Socony-Vacuum territories same as for kerosine which see in tank wagon table for various cities: prices change with kerosine.

	No. 1	No. 2	No. 3	No. 4
ATLANTIC REFINING				
Philadelphia, Pa.	7.75	7.00	7.00	7.00
Allentown, Pa.	8.25	7.50	7.50	7.50
Wilmington, Del.	8.25	7.50	7.50	7.50

	No. 1	No. 2	No. 3	No. 4
ATLANTIC REFINING Cont'd				
Springfield, Mass.	9.00	7.50	....	7.50
Worcester, Mass.	9.00	7.50	....	7.50
Hartford, Conn.	9.00	7.50	....	7.50
S. O. OHIO				
Columbus Division and Cleveland	7.50	7.50	7.00	....
City of Lima	8.00	8.00	7.00	....
Rest of Ohio	8.00	8.00	7.50	....

Note: S. O. Ohio prices are for full compartment hose dumps, bucket dumps are 0.5c per gallon higher.

S. O. INDIANA

Stanolex Fuel and Furnace Oils

	No. 1 Fuel	Stanolex Furnace
Chicago	†8.8	7.00
Indianapolis	...	*11.8
Detroit	...	7.1
Milwaukee	8.1	7.4
Minneapolis	7.5	7.5
Sioux City	7.2	7.2
St. Louis	7.5	6.8
Kansas City	6.6	6.6

*Includes state tax of 4c.

†This price applies to 1 to 99 gals. deliveries; 150 gals. and over, 7c.

Note: Small-lot deliveries of light fuel oils range up to 2c higher than above quotations.

REFINERY TANK CAR MARKETS

All prices on this page are publisher's opinion of open market quotations or sales, for spot shipment (10 to 15 days) unless otherwise stated. Prices in cents per gallon, except heavy fuel oils in dollars per barrel, wax and petrolatums in cents per pound in barrels, tank car lots, f.o.b. refineries in districts designated, except where otherwise noted. Inter-refinery and export prices not included unless so stated in the respective markets. Federal, state or municipal taxes not included. Prices quoted apply on products made from legally produced crude. Unless otherwise noted, gasoline octane ratings are determined by C.F.R. Motor method, A.S.T.M. D-357-33T; and lubricating oil specifications determined according to A.S.T.M. methods, unless otherwise noted

Cylinder Stocks (cont'd)

Prices Effective	Feb. 7	Jan. 31
Mid-Continent (cont'd)		
120 Vis. at 210° D:		
0 to 10 p.p.	15.125–15.25	15.125–15.25
10 to 25 p.p.	14.50	14.50
25 to 40 p.p.	14.25	14.25
600 S.R. Dark Green	5.00 – 7.50	5.00 – 7.50
600 S.R. Olive Green	7.00 – 9.50	7.00 – 9.50
631 S.R.	(b)12.50	(b)12.50
Black Oil	3.50 – 4.00	3.50 – 4.00
CHICAGO (Viscosity at 210°)		
Unfiltered Steam Refined:		
140	9.00	9.00
160	10.00	10.00
200	11.00	11.00
Bright stocks, 160 vis. at 210. No. 8 color:		
0 to 10 p.p.	17.75	17.75
15 to 25 p.p.	16.75	16.75
30 to 40 p.p.	16.25	16.25
E filtered Cyl. Stock	14.50	14.50

To obtain prices delivered in Chicago, add 0.25c per gal.
(a) Nominal.
(b) Only one refiner quoting.

Prices Effective	Feb. 7	Jan. 31
(f) **WESTERN PENNA.**		
600 S.R. filterable	8.50 – 9.00	8.50 – 9.00
650 S.R.	10.50 –11.50	10.50 –11.50
600 fl.	11.00 –12.00	11.00 –12.00
630 fl.	14.00 –16.00	14.00 –16.00
600 Warren E.	13.00 –13.50	13.00 –13.50

(f) Quotations only.

Bright stock, 145-155 vis. at 210°, 540-550 flash, No. 8 color:		
10 p.t.	18.50 –19.00	18.50 –19.00
15 p.t.	17.50 –18.00	17.50 –18.00
20 p.t.	16.50 –17.00	16.50 –17.00
25 p.t.	15.50 –16.00	15.50 –16.00

Petrolatums

WESTERN PENNA. (Per lb., in barrels, carload lots. In tank cars, 0.5c per lb. less).

Snow White	6.625– 6.75	6.625– 6.75
Lily White	5.625– 5.75	5.625– 5.75
Cream White	4.625– 4.75	4.625– 4.75
Light Amber	2.75 – 2.875	2.75 – 2.875
Amber	2.50 – 2.625	2.50 – 2.625
Red	2.125– 2.375	2.125– 2.375

Wax

Prices Effective	Feb. 7	Jan. 31
WESTERN PENNA. (Per lb., f.o.b. New York basis.)		
122-124 w.c. scale, A.m.p.	2.20 – 2.25	2.25 – 2.35
124-126 w.c. scale, A.m.p.	2.20 – 2.25	2.25 – 2.35
OKLAHOMA (Per lb. in bbls.; in a few instances, per lb. in burlap bags).		
124-126 w.c. scale, A.m.p.	2.50 – 2.75	2.60 – 2.75

CHICAGO (In bags, carload lots. Melting points are E.M.P. (A.S.T.M.) methods; add 3° F. to convert into A.m.p.)

Fully refined:		
122-124	4.45 – 4.55	4.65 – 4.75
125-127	4.55 – 4.65	4.90 – 5.00
127-129	4.65 – 4.75	5.05 – 5.15
130-132	**5.10 – 5.20	**5.45 – 5.55
132-134	**5.35 – 5.45	**5.70 – 5.80
135-137	**6.10 – 6.20	**6.45 – 6.55

**Same prices quoted in bags or slabs loose.

MID-WESTERN TANK CAR MARKET

Prices are those made by Chicago sellers, on Group 3 (Oklahoma) freight basis, although shipments may originate in other South-western or Mid-western refining districts

Gasoline

Prices Effective	Feb. 7	Jan. 31
U. S. Motor: (Octane Test L-3)		
62 oct. and below	3.75 – 4.00	3.75 – 4.00
63-66 oct.	4.00 – 4.375	4.00 – 4.25
67-69 oct.	4.50 – 4.625	4.50 – 4.625
70-72 oct.	4.625– 5.00	4.50 – 5.00
64-66, 375 e.p.	(b)4.50	(b)4.25
68-70, 350-360 e.p.	(b)5.25	(b)5.25

Kerosine

41-43 w.w.	4.125– 4.375	4.25 – 4.375
42-44 w.w.	4.25 – 4.625	4.375– 4.625

(b) One seller quoting.

Fuel and Gas Oils

Prices Effective	Feb. 7	Jan. 31
Domestic:		
No. 1 p.w.	4.125– 4.375	4.125– 4.375
No. 1 straw	3.875– 4.125	3.875– 4.125
No. 2 straw	3.625– 3.875	3.625– 3.875
No. 2 dark	3.50 – 3.75	3.625– 3.75
No. 3	3.50 – 3.75	3.50 – 3.75
No. 4	$1.05 –$1.10	$1.05 –$1.10
No. 5	$0.80 –$0.85	$0.80 –$0.85
Range oil	4.125– 4.25	4.125– 4.25
Industrial:		
No. 4	$0.95 –$1.10	$0.95 –$1.10
No. 5	$0.775–$0.85	$0.775–$0.85

Prices Effective	Feb. 7	Jan. 31
Industrial (cont'd)		
No. 6	$0.525–$0.60	$0.50 –$0.55
U. G. I. gas oil	2.875– 3.25	2.875– 3.25

Naphtha and Solvent

Stoddard solvent	6.875	6.875
Cleaners' naphtha	7.375	7.375
V. M. & P. naphtha	7.375	7.375
Mineral spirits	6.375	6.375
Rubber solvent	7.375	7.375
Lacquer diluent	8.375	8.375

DAILY GASOLINE PRICES

Daily range of gasoline prices as reported in PLATT'S OILGRAM (Week Ended Feb. 4, 1938)

U. S. Motor, (Octane Number determined according to L-3 Method in Okla., Texas and Mid-Western Districts):	Jan. 31	Feb. 1	Feb. 2	Feb. 3	Feb. 4
62 octane and below:					
Oklahoma	4.00 – 4.25	4.00 – 4.25	4.00 – 4.25	4.00 – 4.25	4.00 – 4.25
*North Texas	†4.50 – 4.875	†4.50 – 4.875	†4.50 – 4.875	†4.50 – 4.875	†4.50 – 4.875
West Texas	4.625– 4.75	4.625– 4.75	4.625– 4.75	4.625– 4.75	4.625– 4.75
Mid-Western (Group 3 basis)	3.75 – 4.00	3.75 – 4.125	3.75 – 4.125	3.75 – 4.00	3.75 – 4.00
63-66 octane:					
Oklahoma	4.375– 4.50	4.375– 4.50	4.375– 4.50	4.375– 4.50	4.375– 4.50
*North Texas	†5.00 – 5.375	†5.00 – 5.375	†5.00 – 5.375	†5.00 – 5.375	†5.00 – 5.375
West Texas	5.125– 5.25	5.125– 5.25	5.125– 5.25	5.125– 5.25	5.125– 5.25
Mid-Western (Group 3 basis)	4.00 – 4.25	4.00 – 4.375	4.00 – 4.375	4.00 – 4.375	4.00 – 4.375
67-69 octane:					
Oklahoma	4.625– 4.875	4.625– 4.875	4.625– 4.875	4.625– 4.875	4.625– 4.875
*North Texas	†5.375– 5.75	†5.375– 5.75	†5.375– 5.75	†5.375– 5.75	†5.375– 5.75
West Texas	5.50 – 5.625	5.50 – 5.625	5.50 – 5.625	5.50 – 5.625	5.50 – 5.625
Mid-Western (Group 3 basis)	4.50 – 4.625	4.50 – 4.625	4.50 – 4.625	4.50 – 4.625	4.50 – 4.625
70-72 octane:					
Oklahoma	4.875– 5.25	4.875– 5.25	4.875– 5.25	4.875– 5.25	4.875– 5.25
*North Texas	†5.625– 6.00	†5.625– 6.00	†5.625– 6.00	†5.625– 6.00	†5.625– 6.00
West Texas	5.875	5.875	5.875	5.875	5.875
Mid-Western (Group 3 basis)	4.50 – 5.00	4.50 – 5.125	4.50 – 5.00	4.50 – 5.00	4.50 – 5.00
Motor Gasoline, 60-64 oct.					
New York harbor	6.50 – 6.75	6.50 – 6.75	6.50 – 6.75	6.50 – 6.75	6.50 – 6.75
Philadelphia district	6.75 – 7.00	6.75 – 7.00	6.75 – 7.00	6.75 – 7.00	6.75 – 7.00
Baltimore district	6.75 – 7.25	6.75 – 7.25	6.75 – 7.25	6.75 – 7.25	6.75 – 7.25
Motor Gasoline, 65 oct. & above:					
New York harbor	6.75 – 7.00	6.75 – 7.00	6.75 – 7.00	6.75 – 7.00	6.75 – 7.00
Philadelphia district	6.75 – 7.00	6.75 – 7.00	6.75 – 7.00	6.75 – 7.00	6.75 – 7.00
Baltimore district	7.00 – 7.50	7.00 – 7.50	7.00 – 7.50	7.00 – 7.50	7.00 – 7.50
U. S. Motor, 58-62°:					
Other districts (Western Penna.)	4.50 – 4.625	4.50 – 4.625	4.50 – 4.625	4.50 – 4.65	4.50 – 4.625
Motor Gasoline, Min. 65 oct.:					
Bradford-Warren (Western Penna.)	6.75 – 7.25	6.75 – 7.25	6.75 – 7.25	6.75 – 7.25	6.75 – 7.25
Other districts (Western Penna.)	6.50 – 7.00	6.50 – 7.00	6.50 – 7.00	6.25 – 6.50	6.25 – 6.50

*For shipment to Texas and New Mexico destinations; Group 3 prices are quoted on northern shipment.
†Nominal.
‡Only one refiner quoting.

TANK WAGON MARKETS

Tank car, tank wagon, dealer, and service station prices for gasoline do not include taxes; they do, however, include inspection fees as shown in general footnote. Gasoline taxes, shown in separate column, include 1c federal, and state taxes; also city and county taxes as indicated in footnotes. Kerosine tank wagon prices include taxes, where levied, as indicated in footnotes. Discounts to various classes of buyers also are shown in footnotes. These prices in effect Feb. 7, 1938, as posted by principal marketing companies at their headquarters offices, but subject to later correction.

S. O. New Jersey

Essolene (*Regular Grade*)

	Consumer Tank Car	Dealer T.W.	Gasoline Taxes	Kerosine T.W.
Atlantic City, N. J.	7.25	8.75	4	8.5
Newark, N. J.	7.25	8.75	4	8.5
Annapolis, Md.	8.35	9.85	5	9.5
Baltimore, Md.	7.75	9.25	5	9
Cumberland, Md.	9.15	11.65	5	10
Washington, D. C.	8	9.5	3	9.5
Danville, Va.	8.95	11.45	6	12.9
Norfolk, Va.	7.75	10.25	6	11.5
Petersburg, Va.	8.05	10.55	6	11.7
Richmond, Va.	8.05	10.55	6	11.7
Roanoke, Va.	9.25	11.75	6	12.9
Charleston, W. Va.	8.55	11.05	6	12.6
Parkersburg, W. Va.	7.85	9.35	6	11.2
Wheeling, W. Va.	8.85	10.25	6	12.2
Charlotte, N. C.	9.15	11.65	7	12.6
Hickory, N. C.	9.65	12.15	7	13
Mt. Airy, N. C.	9.45	11.95	7	12.8
Raleigh, N. C.	8.75	11.25	7	12.1
Salisbury, N. C.	9.25	11.75	7	12.7
Charleston, S. C.	7.75	10.25	7	11.1
Columbia, S. C.	8.75	11.25	7	12.1
Spartanburg, S. C.	9.45	11.95	7	12.9

Discount to undivided dealers: Dealer t.w. price less 0.5c per gal.

Price basis to commercial consumers: To contract accounts, purchasing at least one full compartment at a time by hose connection: Effective March 12, 1937, in New Jersey, and March 8 in Maryland, District of Columbia, and in Arlington and Fairfax Counties in Virginia, on yearly purchases: from 2,500 to 100,000 gals., consumer t.w. price at time and place of delivery; 100,000 gals. per year consumer tank car price, plus 0.5c per gal. Generally consumer t.w. price in foregoing states is equivalent of dealer t.w. price, less 0.5c per gal.

Effective May 15, 1937, on Essolene and Esso (by tank wagon) in North and South Carolina, West Virginia and Virginia (except Arlington and Fairfax Counties, which see above), commercial consumers taking deliveries of 50 gals. (West Va. 100 gals.) or more at one time will be billed at the posted consumer t.w. price. Deliveries less than 50 gals. (West Va. 100 gals.) will be billed at 4c per gal. over posted consumer t.w. price. Generally, posted consumer t.w. price will be equivalent to the dealer price less 0.5c per gal.

Kerosine Discount: 1c off t.w. price for 25 gals., or more, under contract thru territory (Baltimore City contract not necessary) except no discount in state of New Jersey.

Socony-Vacuum Oil Co., Inc.

(*S. O. New York Division*)

Socony Mobilgas (*Regular Grade*)

	Consumer Tank Car	"Split" Dealer T.W.	Gasoline Taxes	Kerosine T.W.
Metropolitan N. Y. City: Boroughs of Manhattan, Bronx and Brooklyn (Kings and Queens)	7.5	9.5	*5	8.75
Borough of Richmond (Staten Is.)	7.5	9.5	*5	8.75
Albany, N. Y.	7.5	9.5	5	9
Binghamton, N. Y.	8.7	10.3	5	9
Buffalo, N. Y.	8.04	9	5	7.5
Jamestown, N. Y.	7.78	10.8	5	8.25
Plattsburg, N. Y.	7.9	10.4	5	9.5
Rochester, N. Y.	8.17	10	5	8.5
Syracuse, N. Y.	8.12	9.5	5	9
Danbury, Conn.	7.8	9.8	4	9
Hartford, Conn.	7.6	9.6	4	8.5
New Haven, Conn.	7.5	9.5	4	8
Bangor, Me.	8.2	9.8	5	9.5
Portland, Me.	7.7	9.5	5	8.75
Boston, Mass.	7.5	9	4	8.5
Concord, N. H.	8.2	10.5	5	9.5
Lancaster, N. H.	9.1	11.5	5	10.25
Manchester, N. H.	8	10	5	9
Providence, R. I.	7.5	9.3	4	8.5
Burlington, Vt.	7.9	9.9	5	9.5
Rutland, Vt.	8.2	10.2	5	9

*Plus 2% city sales tax computed at time of each sale.

Discount to undivided dealers: 0.5c less than "split" dealer t.w.

Price basis to commercial consumers: Effective about Nov. 15, 1936 in New York and New England for tank wagon delivery: monthly purchases of 25,000 gals. or over, pay consumer tank car price at point of delivery, plus 0.5c gal.; monthly purchases of 5,000 to 25,000 gals., pay undivided dealer tank wagon price at point of delivery; monthly purchases of less than 5,000 gals., pay divided dealer tank wagon price at point of delivery. Private consumers pay undivided dealer tank wagon price at point of delivery, plus 2c gal.

Atlantic Refining

Atlantic White Flash Gasoline (*Regular Grade*)

	Commercial Tank Car	Dealer T.W.	S.S.	Gasoline Taxes	Kerosine T.W.
Philadelphia, Pa.	7.25	8.25	12	5	10.5
Pittsburgh	8	10	15	5	11
Allentown	7.75	9.25	**	5	11
Erie	8	9.5	**	5	10
Scranton	8	9.5	**	5	11
Altoona	8	10	**	5	11
Harrisburg	7.5	9	**	5	11
Williamsport	8	10	**	5	11
Dover, Del.	...	9.5	**	5	11
Wilmington	...	9	**	5	11
Boston, Mass.	...	9	**	4	8.5
Springfield, Mass.	...	9.5	**	4	8.5
Worcester, Mass.	...	10.3	**	4	9
Fall River, Mass.	...	8.5	**	4	8.5
Hartford, Conn.	...	9.6	**	4	8.5
New Haven, Conn.	...	9.5	**	4	8
Providence, R. I.	...	9.3	**	4	8.5
Atlantic City, N. J.	...	8.75	**	4	9
Camden, N. J.	...	8.75	**	4	9
Trenton, N. J.	...	8.75	**	4	9
Annapolis, Md.	...	9.85	**	5	9.5
Baltimore, Md.	...	9.25	**	5	9
Hagerstown, Md.	...	10.35	**	5	10
Richmond, Va.	...	10.55	**	6	11.7
Wilmington, N. C.	...	10.35	**	7	11.3
Brunswick, Ga.	...	9	**	7	*13
Jacksonville, Fla.	...	9	**	8	10

*Georgia has kerosine tax of 1c per gal., not included in above price.

**Atlantic Refining transferred stations to dealers; no prices available.

Discount to undivided dealers: Dealer t.w. less 0.5c per gal.

Price basis to commercial consumers: in Penna. and Delaware, effective Mar. 11, 1937, on yearly gasoline purchases to contract accounts taking full compartment hose deliveries, using 100,000 gals. or more per year, tank car price plus 0.5c per gal.; consumers taking less than 100,000 gals., undivided dealer price. Consumers under contract and not under contract, taking less than full compartment delivery, and consumers not under contract taking full compartment delivery, get divided dealer price. Consumers taking less than 25 gals., t.w. delivery, get 4c above undivided dealer price.

Discount on kerosine: Effective Oct. 29, 1936, in Pennsylvania and Delaware, 2c per gal. off t.w. price on t.w. deliveries of 25 gals. or more at one time.

S. O. Ohio

Sohio X-70 Gasoline (*Regular Grade*)

	Consumer T.W.	†Divided Dlr.	Gasoline Taxes	Kerosine T.W.
Ohio State-wide	11	10	5	*13
Counties where prices are below statewide:				
Columbiana, Defiance and Pickaway	10.5	9.5	5	....
Franklin, Knox and Paulding	10	9	5	....

Renown Gasoline (*Third Grade*)

Ohio State-wide	10.5	9.5	5	....
Counties where prices are below statewide:				
Columbiana, Defiance and Pickaway	10	9	5	....
Franklin, Knox and Paulding	9.5	8.5	5	....
Counties where prices are above statewide:				
Butler, Clermont, Darke, Greene, Hamilton, Miami, Montgomery, Preble and Warren	11	10	5	....

S. O. Ohio Cont'd

Kerosine Prices

(*Off Statewide Level*)

Kerosine prices are off statewide level in the following counties:

Allen, Auglaize, Champaign, Columbiana, Darke, Geauga, Greene, Hardin, Logan, Mahoning, Mercer, Preble, Putnam, Shelby, Trumbull, Union, Van Wert and Wyandot: *12.5
Paulding: *12
Ashtabula: *11.5
Fayette, Licking, Madison, Pickaway, Portage and Summit: *9.5

†This price also to authorized agents, exclusive of 0.5c rental. Discount to undivided dealers: 0.5c less than divided dealer t.w.

*Kerosine prices include 1c state tax.

Commercial Tank Wagon Q.D.A. to contract accounts: Effective Oct. 20, 1937, thru Ohio (except in 24 counties), on monthly purchases, off posted consumer t.w. price: 0 to 999 gals., 0.5c; 1,000 to 19,999 gals., 1.5c; 20,000 gals. and over, 2.5c. The 24 counties where Q.D.A. differs from statewide are: Allen, Auglaize, Champaign, Darke, Defiance, Erie, Fulton, Geauga, Hamilton, Henry, Logan, Lorain, Lucas, Mercer, Ottawa, Paulding, Putnam, Sandusky, Scioto, Shelby, Van Wert, Washington, Williams and Wood.

Sales tax: Ohio's 3% sales tax, effective Jan. 27, 1935, is added "where assessable, to regular posted prices," S. O. Ohio says.

On kerosine, prices to resellers and commercial consumers are posted generally at 3c per gal. below consumer t.w. price in any quantity, when such prices are on statewide level.

S. O. Kentucky

Crown Gasoline (*Regular Grade*)

	Consumer T.W.	Net Dlr.	Gasoline Taxes	Kerosine T.W.
Covington, Ky.	12.5	10.5	6	11
Lexington, Ky.	13.5	10.5	6	11
Louisville, Ky.	13	10	6	10.5
Paducah, Ky.	13.5	10.5	6	10
Jackson, Miss.	13	10	7	*13
Vicksburg, Miss.	13	10	7	*13
Birmingham, Ala.	14	11	*8	12
Mobile, Ala.	13	10	*9	12
Montgomery, Ala.	13	10	*9	*13
Atlanta, Ga.	14	11	7	*14
Augusta, Ga.	14	11	7	*14
Macon, Ga.	14	11	7	*14.5
Savannah, Ga.	12.5	9.5	7	*12
Jacksonville, Fla.	12.5	9.5	8	11
Miami, Fla.	12.5	9.5	8	12.5
Pensacola, Fla.	13	10	*9	12
Tampa, Fla.	12.5	9.5	8	10.5

Kyso Gasoline (*Third Grade*)

Covington, Ky.	10.5	8	6	....
Lexington, Ky.	11.5	9	6	....
Louisville, Ky.	11	8.5	6	....
Jackson, Miss.	11.5	9	7	....
Vicksburg, Miss.	11	8.5	7	....
Birmingham, Ala.	12	9.5	*8	....
Mobile, Ala.	10.5	8	*9	....
Montgomery, Ala.	10.5	8	*9	....
Atlanta, Ga.	12	9.5	7	....
Augusta, Ga.	12	9.5	7	....
Macon, Ga.	12	9.5	7	....
Savannah, Ga.	10.5	8	7	....
Pensacola, Fla.	11	8.5	*9	....

Discounts to all tank wagon consumers: Effective Jan. 4, 1937, thru territory, on Crown gasoline, 3c per gal. below consumer t.w. price; on Kyso, 2.5c below, regardless of quantity purchased, per month.

Discounts on kerosine: Prices in Kentucky are net, but in other states subject to 2c discount.

**Taxes*: In the tax column is included these city and county gasoline taxes at the following points: Mobile, 2c city; Birmingham, 1c city; Montgomery, 1c city and 1c county; Pensacola, 1c city. Georgia and Mississippi kerosine prices include 1c state tax. Montgomery kerosine price includes 1c city tax.

Above prices include these inspection fees on both gasoline and kerosine, per gallon, figured on basis of 50 gallons per barrel:

Alabama, 1/40c on gasoline, 1/2c on kerosine; Arkansas, 1/5c per gal. in a single barrel. 1/20c per gal. in bulk; Florida, 1/8c; Illinois, 3/100c; Indiana, 1/5c per gal. in lots up to 25 bbls.; 2/25c per gal. in lots of 25 bbls. or more; Kansas, 1/50c, (3/50c can be charged to meet inspection department expenses); Louisiana, 1/32c; Minnesota, 1/25c; Missouri, 3/100c; Nebraska, 3/100c; Nevada, gasoline, 1/20c; North Carolina, 1/4c; North Dakota, 1/20c; Oklahoma, 2/25c per gal. in lots of more than 50 bbls., 1/5c in lots less than 50 bbls.; South Carolina, 1/8c; South Dakota, 1/10c; Tennessee, 2/5c; and Wisconsin, 1/25c.

Kerosine inspection fee only: Iowa, 3/50c; Michigan, 1/5c per gal.

Above gasoline prices do not include taxes (see general note at top of page)

TANK WAGON MARKETS

Tank car, tank wagon, dealer, and service station prices for gasoline do not include taxes; *they do, however, include inspection fees as shown in general footnote. Gasoline taxes, shown in separate column, include* 1c *federal, and state taxes; also city and county taxes as indicated in footnotes. Kerosine tank wagon prices include taxes, where levied, as indicated in footnotes. Discounts to various classes of buyers also are shown in footnotes. These prices in effect Feb.* 7, 1938, *as posted by principal marketing companies at their headquarters offices, but subject to later correction.*

S. O. Indiana

Red Crown (*Regular Grade*)
Stanolind (*Third Grade*)

	Red Crown Cons. T.W.	Dealer Prices Red Crown T.W.	Stanolind T.W.	Gasoline Taxes	Kerosine T.W.
Chicago, Ill.	11.3	9.3	8.1	4	10.2
Decatur, Ill.	11.3	9.1	7.7	4	10.2
Joliet, Ill.	11.3	9.8	8.1	4	10.2
Peoria, Ill.	11.3	9.8	9.3	4	10.2
Quincy, Ill.	11.1	9.6	8.5	4	10
Indianapolis, Ind.	11.9	10.4	9.7	5	*14.8
Evansville, Ind.	11.8	10.3	8.1	5	*14.7
South Bend, Ind.	12.2	10.7	9.2	5	*15.1
Detroit, Mich.	11.1	9.6	9.1	4	9.8
Grand Rapids, Mich	12.3	10.8	10.3	4	11
Saginaw, Mich.	12.1	10.6	10.1	4	9.1
Green Bay, Wis.	12	10.5	9.8	5	9.9
Milwaukee, Wis.	11.5	10	9.2	5	10.4
La Crosse, Wis.	11.7	10.2	9.7	5	10.6
Minneapolis-St. Paul	11.7	10.2	9.7	5	10.6
Duluth, Minn.	12	10.5	10	5	10.9
Mankato, Minn.	11.7	10.2	9.5	5	10.6
Des Moines, Ia.	11.1	9.6	7	4	*11
Sioux City, Ia.	11.3	9.8	9.3	4	*13.2
Davenport, Ia.	11.3	9.8	9.3	4	*13.2
Mason City, Ia.	11.4	9.9	9.4	4	*13.3
St. Louis, Mo.	10.9	9.4	7.2	*4	9.8
Kansas City, Mo.	10.6	9.1	8.6	*4	9.5
St. Joseph, Mo.	10.6	7.4	6	*4	9.5
Fargo, N. D.	12.7	11.2	10.7	4	11.6
Minot, N. D.	13.9	12.4	11.9	4	12.8
Huron, S. D.	12.1	10.6	10.1	*5	11
Wichita, Kans.	10.1	7	6	4	8.5

*Taxes: in the tax column is included these city and state gasoline taxes at following points: Kansas City, St. Joseph and St. Louis, 1c city tax; South Dakota, 0.1c sales tax. State Kerosine taxes: Indiana, 4c; Iowa, 3c, all included in above prices.

Discount to commercial consumers: Effective Jan. 1, 1935, thru territory, except Michigan effective Feb. 1, on purchases per month, discount off t.w. prices; all gasolines, 25 to 1,000 gals., at t.w. price; 1,000 gals., or more, 1.5c off t.w. on Ethyl and Red Crown, and 1c on Stanolind (latter effective June 9, 1937). Minimum delivery is 25 gals.

S. O. Nebraska

Standard Red Crown Gasoline
(*Regular Grade*)

	T.W.	Dealer	Gasoline Taxes	Kerosine T.W.
Omaha, Neb.	11.7	10.2	6	10.5
McCook	11.5	7.5	6	10
Norfolk	12.1	10.6	6	10.9
North Platte	12.5	11	6	11.3
Scottabluff	13.2	10	6	12

Discounts to commercial consumers: for tank wagon deliveries covered only by Standard Commercial Consumer Contract, effective January 1, 1935.

S. O. Louisiana

Essolene
(*Regular Grade*)

	Consumer Tank Car	Dealer T.W.	Gasoline Taxes	Kerosine T.W.
Little Rock, Ark.	7.75	10.25	7.5	11.5
Alexandria, La.	7.75	10.25	8	*10.5
Baton Rouge, La.	7.25	9.75	8	*12
New Orleans, La.	7.25	9.75	*10	*12
Lake Charles, La.	8.25	10.75	8	*12.5
Shreveport, La.	6.75	9.25	8	*9.5
Lafayette, La.	8.25	10.75	8	*13
Bristol, Tenn.	10.25	11.5	8	14.5
Chattanooga, Tenn.	9.75	12.25	8	13.5
Knoxville, Tenn.	10.25	12.75	8	14
Memphis, Tenn.	8.25	10.25	8	12
Nashville, Tenn.	9.25	11.75	8	11.5

*New Orleans gasoline tax includes 7c state, 1c federal, and 2c parish tax. Louisiana kerosine prices include 1c state tax; in addition New Orleans has 1c parish tax.

Price basis to dealers: Undivided dealers get dealer price, less 0.5c.

Price basis to commercial consumers: Effective May 15, 1937, thru territory; commercial consumers taking 50 gals. or more at one time will be billed at posted consumer t.w. price; those taking less than 50 gals. at one time will be billed at 4c per gal. over posted consumer t.w. price. Generally, the posted consumer t.w. price will be equivalent to the dealer price less 0.5c per gal.

Humble Oil & Refining Co.

Humble Motor Fuel
(*Regular Grade*)

	*T.W.	S.S.	Gasoline Taxes	Kerosine T.W.
Dallas, Tex.	9	13	5	8
Ft. Worth, Tex.	9	13	5	8
Houston, Tex.	9.5	13.5	5	8
San Antonio, Tex.	8.5	12.5	5	8

U. S. Motor Gasoline
(*Third Grade*)

Dallas, Tex.	7	10	5
Ft. Worth, Tex.	7.5	10	5
Houston, Tex.	8.5	11.5	5
San Antonio, Tex.	7.5	10.5	5

*Price is t.w. price to all classes of dealers and consumers.

Price basis to "open" dealers: discount off posted retail price: when posted retail price, including all taxes on Esso motor fuel is: 19.1c per gal. and above, discount is 3.5c; 19c to 18.1c, 3c, and 18c and below, 2.5c. Humble motor fuel, 17.1c and above, 3.5c; 17 to 16.1c, 3c; and 16c and below, 2.5c; U. S. motor fuel, 15.1c and above, 2.5c; 15 to 14.1c, 2c; and 14c and below, 1.5c.

Continental Oil

Conoco Bronze (*Regular Grade*)
Demand (*Third Grade*)

	Conoco Bronze	Dealer Prices — Demand	Gasoline Taxes	Kerosine T.W.
Denver, Colo.	10	9	5	11.5
Grand Junc., Colo.	14	13	5	15
Pueblo, Colo.	8	7	5	10.5
Casper, Wyo.	12	11	5	11.5
Cheyenne, Wyo.	11	7	5	13
Billings, Mont.	13.5	12	6	15.5
Butte, Mont.	13.5	10.5	6	15.5
Great Falls, Mont.	13.5	12.5	6	15.5
Helena, Mont.	13.5	12.5	6	15.5
Salt Lake City, Utah	14.5	11.5	5	16
Boise, Ida.	15.5	13.5	6	18
Twin Falls, Ida.	15	14	6	18
Albuquerque, N. M.	11	10	†6.5	12
Roswell, N. M.	11	8.5	†6.5	10.5
Santa Fe, N. M.	12	9.5	*7	12
Muskogee, Okla.	9.5	8	5	7
Oklahoma City, Okla.	9	6	5	8
Tulsa, Okla.	9	6	5	6
Ft. Smith, Ark.	9.75	8.5	5	8
Little Rock, Ark.	9.75	7.625	7.5	9.5
Texarkana, Ark.	9	6	5	8.5

†Includes city tax of 0.5c.
*Includes 1c city tax.

S. O. California

Standard Gasoline
(*Regular Grade*)

	T.W.	S.S.	Gasoline Taxes	Kerosine T.W.
San Francisco, Cal.	13.5	14.5	4	11.5
Los Angeles, Cal.	13	14	4	10
Fresno, Cal.	14.5	15.5	4	12.5
Phoenix, Ariz.	15	16	6	†17
Reno, Nev.	15	16	5	13
Portland, Ore.	14	15	6	13.5
Seattle, Wash.	14	15	6	13.5
Spokane, Wash.	16.5	17.5	6	16
Tacoma, Wash.	14	15	6	13.5

Flight Gasoline
(*Third Grade*)

San Francisco, Cal.	12	13	4	....
Los Angeles, Cal.	11.5	12.5	4	....
Fresno, Cal.	13	14	4	....
Reno, Nev.	13.5	14.5	5	....
Phoenix, Ariz.	13.5	14.5	6	....
Portland, Ore.	12.5	13.5	6	....
Seattle, Wash.	12.5	13.5	6	....
Spokane, Wash.	15	16	6	....
Tacoma, Wash.	12.5	13.5	6	....

†Includes 5c state tax.

Discount to dealers: on gasoline, off t.w. price on Standard Ethyl and Standard Gasoline, to 100% dealers, 3c; to split dealers, 2c; on Flight gasoline, both 100% and split dealers, 2c.

On Stanavo Aviation Gasoline, to all classes of dealers, 3c off t.w.

To commercial consumers: off tank wagon price: on single deliveries of 40 gallons and over. Stanavo Aviation, Standard Ethyl and Standard Gasolines, 3c. Flight Gasoline, 2c per gallon. Tank wagon delivery, less than 40 gals., 1c per gal. above posted t.w. price.

On kerosine 3c off t.w. price: plant deliveries to jobbers, 2.5c below t.w.

Canada

PRICES OF IMPERIAL OIL LTD.

Per Imperial Gallon, which is 1.2 U. S. Gallons

3-Star Imperial Gasoline
(*Regular Grade*)

	T.W.	Gasoline Taxes	Kerosine T.W.
Hamilton, Ont.	16	6	17
Toronto, Ont.	16	6	17
Brandon, Man.	21.1	7	22.3
Winnipeg, Man.	20.5	7	20.7
Regina, Sask.	20	7	22
Saskatoon, Sask.	22.8	7	24.8
Edmonton, Alta.	19.5	7	21.5
Calgary, Alta.	17	7	19
Vancouver, B. C.	16	7	23
Montreal, Que.	15	6	17.5
St. John, N. B.	16	8	18.5
Halifax, N. S.	16	8	18.5

Discounts to undivided dealers, 1c off t.w. price, except Maritime Provinces where undivided dealers pay t.w. price. Divided dealers pay t.w. price, thru territory.

Aviation Gasoline

Following are tank car and/or tank wagon prices, as indicated, of aviation gasoline in principal marketing territories (Stanavo Aviation Gasoline in all territories except where otherwise noted).

S. O. NEW JERSEY

	*Ethyl T.C.	Tank Car	T.W.
Bayonne, N. J.	19.5	9.5	12.5
Baltimore, Md.	....	10	13
Washington, D. C.	....	....	13.5
Richmond, Va.	....	....	14.7
Greensboro, N. C.	....	....	15.7
Raleigh, N. C.	....	....	17.6
Charleston, W. Va.	....	....	12.2

*This is Stanavo Ethyl Aviation Gasoline, 100 octane number, tank car price.

COLONIAL BEACON OIL CO.

	T.W.
Brooklyn, N. Y.	12.8
Buffalo, N. Y.	14.5
Boston, Mass.	15

S. O. PENNSYLVANIA

Philadelphia, Pa.	13.6
Pittsburgh, Pa.	14.4

S. O. LOUISIANA

New Orleans, La.	13.3
Shreveport, La.	13.6

Prices in above four territories are on a 74 octane grade aviation gasoline except where otherwise noted. An 80 octane product generally brings 0.5c premium and an 87 octane product, 1.5c premium over the 74 octane grade.

Note: S.a. prices in above four territories are generally 6c over t.w. prices. Above t.w. prices are net, with no discounts allowed for quantity purchases. T.w. prices are generally tank car price, plus freight, plus 2.5c per gal.

S. O. OHIO
Thru Ohio
Stanavo Ethyl Aviation

	Consumer T.W.	Gasoline Taxes
73 octane	15.5	5
80 octane	16.5	5
87 octane	17.5	5

Discounts: For delivery on contract to hangar operators and resellers: 2c below consumer posted t.w. price, shown above.

S. O. INDIANA
Stanavo Ethyl Aviation Gasoline, 73 Octane Number

Chicago, Ill.	14.6	4
Detroit, Mich.	16.1	4
Milwaukee, Wis.	14.8	5
Minneapolis, Minn.	15	5
St. Louis, Mo.	14.2	3
Kansas City, Mo.	13.9	*4
Fargo, N. D.	16	4
Huron, S. D.	15.4	5

*Includes 1c city tax.

HUMBLE OIL & REFINING CO.

	Tank Car
Baytown, Tex.	8.5

CONTINENTAL OIL CO.
Conoco Special Gasoline

	Dealer	Gasoline Taxes
Denver, Colo.	13	5
Cheyenne, Wyo.	15	5
Helena, Mont.	16.5	6
Salt Lake City, Utah	17.5	5
Albuquerque, N. M.	14	*6.5

*Includes city tax of 0.5c.

S. O. CALIFORNIA

	T.W.	
Phoenix, Ariz.	17	6
Los Angeles, Cal.	15	4
San Francisco, Cal.	15.5	4
Reno, Nev.	17	5
Portland, Ore.	16	6
Seattle, Wash.	16	6
Spokane, Wash.	18.5	6

Note: For discounts, etc., see note under Standard and Flight gasoline above.

Above gasoline prices do not include taxes (see general note at top of page)

TANK WAGON MARKETS

Tank car, tank wagon, dealer, and service station prices for gasoline do not include taxes; *they do, however, include inspection fees as shown in general footnote. Gasoline taxes, shown in separate column, include* 1c *federal, and state taxes; also city and county taxes as indicated in footnotes. Kerosine tank wagon prices include taxes, where levied, as indicated in footnotes. Discounts to various classes of buyers also are shown in footnotes. These prices in effect Feb.* 7, 1938, *as posted by principal marketing companies at their headquarters offices, but subject to later correction.*

Naphtha (In Tank Wagon)

S. O. NEW JERSEY

Posted Tank Wagon Prices

	Mineral Spirits	V.M.&P.
Newark, N. J.	11.5	15.5
Baltimore, Md.	15.5	....
Washington, D. C.	15	....

Discounts: Buyers taking following quantities, at one time, get these discounts: Newark, 2c per gal. on 200 gals. or more; less than 200 gals., 0.5c higher price. Baltimore 2c off on 25 to 100 gals. and 3c on over 100 gals. Washington, 2c off to contract buyers.

SOCONY-VACUUM OIL CO.

Buffalo, N. Y.	13	14
New York City	9.5	11.5
Rochester, N. Y.	13	15
Syracuse, N. Y.	14	15
Boston, Mass.	13.5	14
Bridgeport, Conn.	12.5	14
Hartford, Conn.	12	13.5
Providence, R. I.	13.5	14.5

ATLANTIC REFINING CO.

Philadelphia, Pa.	11.5	12.5
Lancaster, Pa.	13	14
Pittsburgh, Pa.	12.5	14.5

Note: Prices for Mineral Spirits also apply to Stoddard Solvent; and prices for V.M.&P. Naphtha apply also to Light Cleaners Naphtha.

S. O. OHIO

	S.R. Solvent	V.M.&P. Naphtha
Thru Ohio	13.25	13.75

Note: V.M.&P. Naphtha prices also apply on Dry Cleaners naphtha and special Varnolene; Varnolene and Sohio Solvent 0.5c below these prices. Discounts to contract consumers, off t.w. price: 300 to 999 gals., 0.5c; 1,000 to 2,499 gals., 0.75c; 2,500 to 4,999 gals., 1c; 5,000 or more gals., 1.5c.

S. O. INDIANA

(*Prices include state and federal taxes*)

	Oleum Spirits	V.M.&P. Naphtha	Stanisol
Chicago, Ill.	15.9	16.2	15.6
Detroit, Mich.	19.3	18.3	19.4
Kansas City, Mo.	14.4	15.4	14.4
St. Louis, Mo.	14.7	15.7	14.6
Milwaukee, Wis.	19.3	20.3	19.3
Minneapolis, Minn.	19.5	20.5	18.1

Note: Prices for V. M. & P. apply also to Light Cleaners Naphtha. All prices, with exception of Missouri points, include state tax. Prices shown are base prices, before discounts.

Naphtha (In Tank Cars)

In Tank Cars (F. o. b. refinery or seaboard terminal except Ohio, delivered price.)

	V.M.&P. Naphtha	Solvent
Baltimore	10.5	9.5
New York Harbor	10	9
Philadelphia district	10.5	9
Boston	10.5	9.5
Providence	10.5	9.5
Ohio points, delivered	9.375	*8.50

*This is on rubber solvent.

Note: In Ohio, prices on D.C. naphtha and special Varnolene are same as V.M.&P.; on Varnolene and Sohio Solvent, prices are 0.5c less than on V.M.&P.

Latest Changes

From Feb. 1 to Feb. 7 inclusive. Dates and amounts of changes shown. See table for full current prices.

S. O. Ohio—Q.D.A. Change:

Meigs county reverted to statewide Q.D.A., Feb. 5, with monthly purchases of under 1,000 gals. of motor gasolines getting discount of 0.5c per gal. Formerly this quantity was billed at posted t. w. price.

Continental Oil—Conoco Bronze & Demand:

Pueblo, dealer price cut 1c, Feb. 1.

California

(*Continued from page* 56)

Except for continued inquiry by Pacific foreign buyers for quotations on Kerosine Distillate in cargo lots, local offshore markets were quiet. This interest K.D. was for several cargoes over the next several months. Quotations were understood to range in the neighborhood of 4.00 to 4.25 cents.

Although there was an evident tendency toward slightly lower quotations on U. S. Motor gasoline in bulk, occasioned by weakness on this product at the Gulf, cargo quotations on higher end point and octane products were not indicated as softening. 5.50 to 5.75 cents was the value placed on U. S. Motor; 5.75 to 6.00 cents on 400 e.p. under 65 octane; and 6.00 to 6.25 on 400 e.p., above 65 octane.

Burning oils offered by independent plants in the southern California area continued rather soft. Quotations on diesel oil in tank car lots ranged at 3.25 to 3.75 cents a gallon and stove distillate was available at upward of 3.50 cents.

Some independent gasoline from the San Joaquin Valley was reported delivered to service stations in Los Angeles at a price of 7.75 cents, exclusive of all tax, for tank truck and trailer lots. The net back to refinery on this would not exceed 7.25 cents. Other independent plants were asking 8.00 cents for a comparable grade delivered to retail outlets.

Wax

Scale Prices Drop

NEW YORK, Feb. 7.—Crude scale wax prices were lower in the New York harbor and New Orleans markets for export and domestic shipment, according to reports of traders the past week.

White crude scale was reported sold to brokers for shipment from New Orleans at 2.10 cents during the week. General prices to consumers in the New York market, however, generally ranged five points higher than resellers' selling prices at New Orleans.

While occasional reports of shading of fully refined prices continued to be heard, no lower priced offerings could be confirmed.

Joins Petroleum Oils

KANSAS CITY, Feb. 5. — Don F. Wilson, formerly Kansas City representative for Acme Petroleum Co., Chicago, Feb. 1 joined Petroleum Oils Corp., Feb. 1, Kansas City.

Wilson has been buying and selling petroleum products in the middle west for the past nine years. He was with Sinclair Refining Co. for three years, and with Acme Petroleum Co. for five years.

Colonial Esso Men Have 3-Day Meeting

NEW YORK, Feb. 7. — Sales representatives from eight states and the District of Columbia of Colonial Esso Marketers, were to hold a three-day meeting at Lake Placid Feb. 7, 8 and 9, to discuss current year's sales problems and possibilities.

Officials from New York who planned to attend the meeting included R. T. Haslam, general sales manager of Esso Marketers; A. Clarke Bedford, president, Colonial Beacon Oil Co.; F. W. Abrams, president, Standard Oil Co. of New Jersey; C. G. Sheffield, sales manager, northern area, Esso Marketers; R. N. Keppel, regional manager, E. A. Holbein, manager of tank car sales, F. M. Surface, sales research manager, and J. W. Connolly, fuel oil sales manager.

Members of the oil burner sales organization were also to meet with W. W. Townsend, New York, in charge.

CHICAGO, Feb. 7. — Lawrence D. McGuan and Izora Agnes Ott were married here Feb. 5. McGuan has been a market reporter on *Platt's Oilgram* for 11 years, recently being transferred from its Chicago to New York offices.

SEABOARD MARKETS, EXPORT AND COASTWISE

All prices on this page are publisher's opinion of open market quotations or sales, for spot shipment (10 to 15 days). In cargo markets, spot shipment is 90 days. Prices in cents per gallon, except heavy fuel oil in dollars per barrel, in tank car lots, f.o.b. refineries or seaboard terminals in districts designated, unless otherwise noted. Federal, state or municipal taxes not included. Prices quoted apply on products made from legally produced crude. Unless otherwise noted, gasoline octane ratings are determined by C.F.R. Motor method, A.S.T.M.D-357-33T; and lubricating oil specifications determined according to A.S.T.M. methods, unless otherwise noted.

Eastern Domestic

(Inter-refinery and export prices not included.)

MOTOR GASOLINE

Prices Effective	Feb. 7	
District:	(a)60-64 Oct.	(a)65 Oct. & Above
N. Y. harbor	6.50 – 6.75	6.75 – 7.00
(b)N.Y.harbor	6.25 – 6.50	6.50 – 7.00
Philadelphia	6.75 – 7.00	6.75 – 7.00
Baltimore	6.75 – 7.25	7.00 – 7.50
Norfolk	7.00 – 7.25	7.25 – 7.50
Wilmington, N. C.	7.00 – 7.25	7.25 – 7.50
Charleston, S. C.	7.00 – 7.25	7.25 – 7.50
Savannah	7.00 – 7.25	7.25 – 7.50
Jacksonville	7.00 – 7.25	7.25 – 7.50
Portland	7.00	7.25
Boston	6.75	7.00
Providence	6.75	7.00

(a)Prices are nominal. (b)Barge lots.

WATER WHITE KEROSINE

District:			
N. Y. harbor	6.00	Charleston	6.00
(b)N. Y. harbor	5.875	Savannah	5.75
Philadelphia	6.00 – 6.25	Jacksonville	5.75
Baltimore	6.00	Portland	6.75
Norfolk	6.00	Boston	(e)6.25–6.40
Wilmington, N.C.	6.00	Providence	6.40

(b)Barge lots.

(c)FUEL OILS

	N. Y. harb.	N. Y. harb. barges
No. 1	6.00	5.875
Nos. 2-3	5.00	4.875
No. 4	5.00	4.875– 5.00
No. 5	$1.45 – 1.55	.....
No. 6	$1.25	.....

	Phila. dist.	Balt. dist.
No. 1	6.00 – 6.25	6.00
Nos. 2-3	5.00 – 5.25	5.00
No. 4	4.75 – 5.25	5.00
No. 5	$1.45–$1.475	$1.45–$1.55
No. 6	$1.25	$1.25

	Bost. dist.	Prov. dist.
No. 1	(e)6.25 – 6.40	6.40
Nos. 2-3	(e)5.25 – 5.40	(f)5.40
No. 4	(e)5.25 – 5.40	(f)5.40
No. 5	$1.45–$1.55	.....
No. 6	$1.25	.....

(c)Fuel oils meet specifications of U. S. Commercial Standards CS12-35.

(f)Some suppliers quote 5.40c delivered Providence district.

(e)Top price of range represents delivered prices within local switching district.

District:	(b)Bunker C Fuel	(b)Diesel Oil
N. Y. harbor	(e)$1.25	(d)$2.10
Philadelphia	(e)$1.25	(e)$2.10–$2.20
Baltimore	(e)$1.25	(d)$2.10
Norfolk	(c)$1.25	$2.10
Charleston	$1.20	$2.10
Savannah	(c)$1.20	$2.10
Jacksonville	(c)$1.20	$2.20
Tampa	(c)$1.20	$2.10
Portland	$1.35	$2.35
Boston	(e)$1.25	(d)$2.20
Providence	$1.25	$2.25

(b)In ship's bunkers.
(c)For barging add 5c per bbl.
(d)For barging add 6.5c to 7.5c per bbl.
(e)For barging add 5c to 6c per bbl.

	Gas Oil 28-34 Gravity	Diesel Oil Shore Plants
N. Y. harbor	5.25	5.25
Philadelphia dist.	5.00	....
Baltimore dist.	5.25	....
Norfolk dist.	5.25	....
Savannah dist.	....	5.25
Jacksonville dist.	....	5.25

Pacific Export

(Quotations are at seaboard, Los Angeles, in cargo lots, cents per gal., except where otherwise noted.)

Prices Effective	Feb. 7	Jan. 31
U. S. Motor, under 65 oct.	5.50 – 5.75	5.50 – 5.75
400 e.p. blend, under 65 oct.	5.75 – 6.00	5.75 – 5.875
400 e.p. blend 65 oct. & above	6.00 – 6.25	5.875– 6.00
(b)38-40 w.w.kerosine	4.75 – 5.00	4.75 – 5.00
41-43 w.w. kerosine	5.00 – 5.50	5.00 – 5.50
44 w.w. kerosine	5.50 – 5.75	5.50 – 5.75

(b)150 fire point.

Prices Effective	Feb. 7	Jan. 31
In Cargo lots, per bbl.		
Diesel fuel, 24° & above	$1.45 –$1.50	$1.45 –$1.50
Diesel fuel, under 24°..	$1.40 –$1.45	$1.40 –$1.45
(b)30-34 diesel(gas oil)	$1.55 –$1.65	$1.55 –$1.65
(c)Grade C fuel oil	$0.85 –$0.90	$0.85 –$0.90

Note: For San Francisco cargo prices, add 5c per bbl. to above cargo prices.

In Ships' Bunkers, or deep tank lots, per bbl.:		
(b)Diesel fuel oil	$1.625–$1.65	$1.625–$1.65
(c)Grade C fuel oil	$0.975–$1.00	$0.975–$1.00

(b)Pacific specification 200. (c)Pacific specification 400.

Cased Goods: (Per case)		
U. S. Motor	$1.45 –$1.575	$1.45 –$1.575
400 e.p. blend, under 65 octane	$1.55 –$1.65	$1.55 –$1.65
400 e.p. blend, 65 oct. & above	$1.65 –$1.75	$1.65 –$1.75
(b)40-43 w.w. kerosine	$1.35 –$1.45	$1.35 –$1.45
Kerosine, p.w.	$1.30 –$1.40	$1.30 –$1.40

(b)150 fire point.

New York Export

(Prices in cents per gal. in bbls. F.a.s. New York)

CYLINDER OILS (Pennsylvania Products)

Bright stock:		
Light, 25 p.t.	22.50 –23.00	22.50 –23.00
Dark, 25 p.t.	22.00 –22.50	22.00 –22.50
Neutral oil:		
200 3 color, 25 p.t.	24.50 –25.00	24.50 –25.00
150 3 color, 25 p.t.	22.50 –23.00	22.50 –23.00
600 Warren E filtered	21.00 –21.50	21.00 –21.50
600 s.r., unfiltered	15.50 –16.00	15.50 –16.00
650 s.r., unfiltered	18.50 –19.00	18.50 –19.00
600 fl., s.r.	19.00 –19.50	19.00 –19.50
630 fl., s.r.	23.00 –23.50	23.00 –23.50

Wax, Domestic *and* Export

(Prices in cents per lb. Tests made by A. S. T. M. methods. Melting points shown below, however, are A. M. P., 3° higher than A. S. T. M. (E.M.P.) melting points. Export prices are f.a.s. carload lots. Domestic prices are f.o.b. refineries in New York and New Orleans districts, in bags, carload lots, with 0.2c discount allowed for shipment in bulk. Scale, solid and fully refined, slabs in bags.)

Prices Effective	Feb. 7	
	New York	
	Domestic	Export
124-6 Y.C. scale	2.10 – 2.15	2.10 – 2.15
122-4 W.C. scale	2.15 – 2.25	2.15 – 2.25
124-6 W.C. scale	2.15 – 2.25	2.15 – 2.25
123-5 Fully rfd.	4.20	3.75
125-7 Fully rfd.	4.35	3.875
128-30 Fully rfd.	4.45	4.125
130-2 Fully rfd.	4.55	4.375
133-5 Fully rfd.	(a)5.00	4.875
135-7 Fully rfd.	(a)5.25	5.125
	New Orleans	
	Domestic	Export
124-6 Y.C. scale	2.05 – 2.10	2.05 – 2.10
122-4 W.C. scale	2.10 – 2.20	2.10 – 2.20
124-6 W.C. scale	2.10 – 2.20	2.10 – 2.20
123-5 Fully rfd.	4.20	3.75
125-7 Fully rfd.	4.35	3.875
128-30 Fully rfd.	4.45	4.125
130-2 Fully rfd.	4.55	4.375
133-5 Fully rfd.	(a)5.00	4.875

(b)Shipment either in bags or in bulk.

Gulf Coast

(Prices are f.o.b. ship at Gulf oil terminals representing opinions of traders, except prices specified to the contrary. Prices cover bulk shipments of 20,000 bbls. or more, unless otherwise noted.)

Prices Effective	Feb. 7	Jan. 31
For Domestic shipment:		
MOTOR GASOLINE		
59 oct. & below	(a)5.125–5.25	(a)5.125–5.25
60-64 oct. number	(a)5.25 –5.375	(a)5.25 –5.375
65 oct. & above	5.75 – 5.875	5.75 – 5.875
FUEL OILS		
No. 1	4.75 – 5.00	5.125
No. 2	4.00 – 4.25	4.125– 4.25
No. 4	(b)	(b)

(b) No price available.

KEROSINE		
41-43 w w	4.75 – 5.00	5.125
For Export Shipment:		
GASOLINE		
U. S. Motor	4.875– 5.00	4.875– 5.00
60-62, 400 e.p.	4.875– 5.00	4.875– 5.00
61-63, 390 e.p.	5.00 – 5.125	5.00 – 5.125
64-66, 375 e.p.	5.00 – 5.125	5.125– 5.25
KEROSINE		
44 w.w.	(a) 4.875–5.00	(a)5.00
41-43 w.w.	4.75 – 5.00	4.875– 5.00
41-43 p.w.	4.75 – 4.875	4.75 – 5.00

(a)Nominal.

Prices Effective	Feb. 7	Jan. 31
GAS AND BUNKER OILS		
For Domestic and/or Export Shipment		
(b)26-30 translucent gas oil	4.00 – 4.25	4.00 – 4.25
(b)30 plus translucent gas oil	4.00 – 4.25	4.125– 4.375
(b)30 plus transparent gas oil	4.00 – 4.25	4.125– 4.375
Diesel Oil Ship's bkrs.	(c)$1.90	(c)$1.90
Grade C bunker oil for ship's bunkers	(c)$0.95	(c)$0.95
Grade C bunker oil, in cargoes	$0.80	$0.80

(b)Less than ½ of 1% sulphur. (c)Barging 5c bbl. additional at some Gulf ports.

MEXICAN CRUDE AND BUNKER OILS

(F.o.b. Steamer, Tampico)

Heavy Panuco crude, taxes to be paid	(a) $0.88–$0.90	(a)$0.96
Grade C bunker oil, ship's bunkers, taxes paid	$0.95	$0.95

(a)Nominal.

MID-CONTINENT LUBRICATING OILS

(Prices in cents per gal. for export shipment, f.o.b. Gulf in bulk, f.a.s. Gulf in bbls.)

	Feb. 7	
190-200 vis. D 210 brt.	(b)Barrels	Bulk
stock	24.00 –25.00	18.00 –20.50
150-160 vis. D 210 brt. stock:		
0-10 p.p.	20.00 –20.50	13.50 –14.50
10-25 p.p.	20.00	13.00 –14.00
150-160 vis. E 210 brt. stock	19.50 –20.00	13.50
120 vis. D 210 brt. stock:	19.50 –20.00	13.50

(b)Second hand barrels.

	Feb. 7	Jan. 31
180 vis. No. 3 color neutral:		
0-10 p.p.	11.75 –12.00	11.75 –12.00
15-30 p.p.	11.25 –11.50	11.25 –11.50
200 vis. No. 3 color neutral:		
0-10 p.p.	12.25 –12.50	12.25 –12.50
15-30 p.p.	11.75 –12.00	11.75 –12.00
600 s.r. olive green	9.00 –11.25	9.00 –11.25
600 s.r. dark green	7.00 – 9.25	7.00 – 9.25

SOUTH TEXAS LUBRICATING OILS

(Vis. at 100° cold test 0, bulk export shipment, f.o.b Gulf oil terminals.)

Unfiltered Pale Oils: Vis.	Color	
100	No. 3	5.50	5.50
200	No. 3	7.25	7.25
300	No. 3	7.75	7.75
500	No. 3½	8.75	8.75
750	No. 4	9.25	9.25
1200	No. 4	9.75	9.75
2000	No. 4	10.00 –10.25	10.00 –10.25

Red Oils: Vis.	Color	
100	No. 5-6	5.50	5.50
200	No. 5-6	7.25	7.25
300	No. 5-6	7.75	7.75
500	No. 5-6	8.75	8.75
750	No. 5-6	9.25	9.25
1200	No. 5-6	9.75	9.75
2000	No. 5-6	10.00 –10.25	10.00 –10.25

Note: Red oil prices shown above cover oils with green cast; prices for blue cast red oils are slightly lower in some cases.

Tanker Rates

(Approximate tanker freight rates to Continental ports, in shillings per ton of 2240 lbs., British sterling; to U. S. ports in cents per bbl.)

Rates Effective Feb. 7

	Crude &/or Fuel		Refined Oil &/or Spirits	
	Last Paid	Owners Ask	Last Paid	Owners Ask
Gulf-U.K./Cont.(b)	26/9	27/6-29/	29/	31/-32/
Aruba-U.K./Cont.(b)	23/	24/-25/	25/	26/6-28/
Gulf-N. Atlantic(c) (not E. of N.Y.):				
Hvy. Crude & Fuel. (10 to 19.9 gravity)	39c	39c-40c	....	....
Light Crude, (30 Grav. or Lighter)	35c	35c-36c	....	....
Gasoline	....	....	39c	(a)39c
Kerosine	....	....	40c	(a)40c
Light Fuel	....	....	41c	(a)41c

(a)Nominal.

(b)Continental ports in range between Bordeaux and Hamburg, both inclusive.

(c)Venezuela loading same rate: Tampico 2c to 3c per bbl. additional.

CRUDE OIL MARKETS

Prices in $ per bbl. of 42 U. S. gals. at the well. A. P. I gravity. Prices are effective as of 7 a. m. of dates as given

EASTERN FIELDS

Posted by Joseph Seep Purchasing Agency

(Effective Dec. 1, 1937, except Corning Sept. 2, 1937)

Penna. Grade Oil in Southwest Penna. Pipe Lines.....$1.88
Penna. Grade Oil in Eureka Pipe Lines (West Virginia).....$1.82
Penna. Grade Oil in Buckeye Pipe Lines (Macksburg, O.).....$1.70
Corning Oil in Buckeye Pipe Lines (Ohio)...$1.27

Posted by Other Companies

Tide Water Associated Oil Co.
Bradford-Allegany district (Penna. and N. Y.) (Effective Dec. 1, 1937).....$2.20
*The Pennzoil Co.: (Effective Dec. 1, 1937)
Penna. Grade Oil in National Transit Lines*$2.15
Ashland Oil & Transportation Co.:
Somerset Oil in Ashland Lines (Ky.):
(Effective Jan. 28, 1937)
Big Sandy River.....$1.42
Kentucky River.....$1.50

*The Pennzoil Co. posts $2.15 in Cochran, Franklin, Hamilton and Doolittle, Pa. fields; prices in other lower districts range down to $2.10 per bbl. at well.

MICHIGAN

Posted by Pure Oil Co.

Midland, Midland County (Jan. 5, 1938)....$1.12

Posted by Simrall Pipe Line Corp.

(Effective Dec. 29, 1937)

West Branch, Arenac, and equal grades.... $0.80

(Effective Jan. 8, 1938)

Beaverton, Crystal, Greendale, Porter and equal grades.....$1.12
Buckeye, Bentley, Billings, Tobacco and equal grades.....$1.095

CENTRAL STATES FIELDS

Posted by Ohio Oil Co.

(Effective Jan. 28, 1937)

Illinois, Princeton.....$1.35
Owensboro (Western Ky.).....$1.40

(Effective Nov. 20, 1937)

Lima, O.....$1.00

Posted by Stoll Oil Refining Co.

(Effective Feb. 1, 1937)

Stoll Pipe Line Oil (Ky.).....$1.40

CANADIAN FIELDS

Posted by Imperial Oil Limited

Western Ontario

(Effective Sept. 9, 1933)

Petrolia.....$2.10
Oil Springs.....$2.17

Alberta—Turner Valley

(Prices f.o.b. field tankage)

(Effective Jan. 5, 1938)

Crude Oil

40-40.9°	$1.14	53-53.9	$1.40
41-41.9	1.16	54-54.9	1.42
42-42.9	1.18	55-55.9	1.44
43-43.9	1.20	56-56.9	1.46
44-44.9	1.22	57-57.9	1.48
45-45.9	1.24	58-58.9	1.50
46-46.9	1.26	59-59.9	1.52
47-47.9	1.28	60-60.9	1.54
48-48.9	1.30	61-61.9	1.56
49-49.9	1.32	62-62.9	1.58
50-50.9	1.34	63-63.9	1.60
51-51.9	1.36	64-64.9	1.62
52-52.9	1.38		

Crude Naphtha, 65 grav. & above.....$2.14

Absorption Gasoline

90% Rec., 20 lb. Reid v.p.....$1.94
90% Rec., 17 lb. Reid v.p.....$2.08

MID-CONTINENT

Posted by Stanolind Crude Oil Purchasing Co., Jan. 28, 1937

	(In Oklahoma-Kansas)*	(In North-North Central Texas)
Below 29	$1.06	$0.96
29-29.9	1.08	0.98
30-30.9	1.10	1.00
31-31.9	1.12	1.02
32-32.9	1.14	1.04
33-33.9	1.16	1.06
34-34.9	1.18	1.08
35-35.9	1.20	1.10
36-36.9	1.22	1.12
37-37.9	1.24	1.14
38-38.9	1.26	1.16
39-39.9	1.28	1.18
40 & above	1.30	1.20

Above Stanolind prices met as follows:

Jan. 28, Continental Oil Co. met in Okla., Kans., and North Texas. Sinclair-Prairie met in North Texas and North Central Texas, Jan. 28, Stanolind's North Texas schedule. Same date, The Texas Co. met in North-North Central Texas.

Note: Stanolind prices in Okla.-Kans. are for quantities computed by 97% tank tables. In Texas, 100% tank tables are used effective Oct. 1, 1937, volume corrected to 60° F., and deduction for full b.s. & w. content.

*Effective Aug. 1, 1937, for Otis-Albert pools Rush-Barton counties, Kans., 13c less.

Posted by Carter Oil Co.

In Oklahoma

(Effective Jan. 28, 1937)

Below 25	$0.98	33-33.9	$1.16
25-25.9	1.00	34-34.9	1.18
26-26.9	1.02	35-35.9	1.20
27-27.9	1.04	36-36.9	1.22
28-28.9	1.06	37-37.9	1.24
29-29.9	1.08	38-38.9	1.26
30-30.9	1.10	39-39.9	1.28
31-31.9	1.12	40 and above...	1.30
32-32.9	1.14		

Above Carter schedule met Jan. 28 by the following companies: Sinclair-Prairie, Shell and Bransdall in Oklahoma-Kansas; Skelly Oil in Kansas; Tide Water in Oklahoma; Pure Oil in Oklahoma-Kansas, beginning with below 24 at $0.98 and ending with 40 & above at $1.30.

Posted by Magnolia Petroleum Co.

(Effective Jan. 28, 1937)

In Oklahoma, same schedule as Carter Oil, which see above, beginning with below 25, at $0.98 and ending with 40 & above, at $1.30.

In Texas: North and North Central, including Burkburnett, Archer, Henrietta, Electra, Comanche and Olden, same gravity and price schedule as Stanolind in North Texas, which see under Stanolind, beginning with below 29 at $0.96 and ending with 40 and above, at $1.20.

Beaumont, Tex.

(Effective Oct. 1, 1937)

Below 21°	$0.95	27-27.9	$1.15
21-21.9	0.98	28-28.9	1.17
22-22.9	1.01	29-29.9	1.19
23-23.9	1.04	30-30.9	1.21
24-24.9	1.07	31-31.9	1.23
25-25.9	1.10	32-32.9	1.25
26-26.9	1.13	33-33.9	1.27
		34 & above	1.29

TEXAS FIELDS

Posted by Humble Oil & Refining Co.

(*West Central Texas)

(Effective Jan. 28, 1937)

Below 29	$0.96	35-35.9	$1.10
29-29.9	0.98	36-36.9	1.12
30-30.9	1.00	37-37.9	1.14
31-31.9	1.02	38-38.9	1.16
32-32.9	1.04	39-39.9	1.18
33-33.9	1.06	40 and above...	1.20
34-34.9	1.08		

*Includes Brown, Callahan, Coleman, Comanche, Eastland, Fisher, Haskell, Jones, Shackelford, Stephens, Throckmorton and Young counties.

Shell Petroleum Corp., effective Jan. 28, posts Humble's above schedule on Fisher county crude, plus these five lower grades, beginning with below 25 gravity at $0.88; 25-25.9, $0.90; 26-26.9, $0.92; 27-27.9, $0.94, and 28-28.9, $0.96; rest of schedule same as Humble's in West Central Texas.

Note: Effective Oct. 1, 1937, Humble prices are based on 100% tank tables at 60F.

**East Central Texas*

(Effective Jan. 28, 1937)

Below 29	$1.03	35-35.9	$1.17
29-29.9	1.05	36-36.9	1.19
30-30.9	1.07	37-37.9	1.21
31-31.9	1.09	38-38.9	1.23
32-32.9	1.11	39-39.9	1.25
33-33.9	1.13	40 and above...	1.27
34-34.9	1.15		

*Including Anderson, Cherokee, Limestone, Navarro counties.

Same date, Sinclair-Prairie met in Mexia Humble's above schedule.

PANHANDLE TEXAS

Posted by Humble Oil & Refining Co.

(Effective Jan. 28, 1937)

	Gray County	Carson-Hutchinson
Below 35	$0.96	$0.91
35-35.9	0.98	0.93
36-36.9	1.00	0.95
37-37.9	1.02	0.97
38-38.9	1.04	0.99
39-39.9	1.06	1.01
40 & above	1.08	1.03

Jan. 28, above prices met by Sinclair-Prairie and Magnolia in the entire area and by Continental in Carson-Hutchinson and by Texas Co. in Panhandle Sweet, same as Humble's Gray Co. and on Panhandle Sour, same as Carson-Hutchinson.

EAST TEXAS

(Effective May 22, 1937)

Stanolind, Humble, Shell, Sinclair-Prairie, Texas Co., and Magnolia.....$1.35

Shell also posted on Jan. 28, in Livingston area, Polk County, Texas, $1.27.

NORTHEAST TEXAS

(Posted by Humble, Jan. 28, 1937)

Talco.....$0.73

(Posted by Magnolia, Jan. 28, 1937)

Cass County and Panola County, Tex.:

Same gravity and price schedule as S. O. Louisiana posts for Rodessa, La., which see under that company.

(Posted by The Texas Co., Jan. 28, 1937)

Cass County.....$1.25

WEST TEXAS AND NEW MEXICO

Posted by Humble Oil & Refining Co.

(Effective Jan. 28, 1937)

(Including Andrews, Crane, Crockett, Ector, Glasscock, Howard, Winkler and Upton Counties, Texas and Lea county, New Mexico).

Below 26	$0.78	33-33.9	$0.94
26-26.9	0.80	34-34.9	0.96
27-27.9	0.82	35-35.9	0.98
28-28.9	0.84	36-36.9	1.00
29-29.9	0.86	37-37.9	1.02
30-30.9	0.88	38-38.9	1.04
31-31.9	0.90	39-39.9	1.06
32-32.9	0.92	40 & above....	1.08
Pecos, West Texas			$0.91

Jan. 28, Magnolia met Humble in Crane, Upton, Howard, Glasscock, Mitchell and Winkler.

Shell Petroleum Corp., on Jan. 28, met Humble in Crane, Glasscock, Howard, Pecos (except Yates shallow pool), Winkler, and Upton counties, Tex., and in Lea County, N. Mex. On Jan. 28, Shell posted in Yates shallow pool in Pecos county, Tex., $0.81. June 4, 1937, Shell added Ector county to West Texas postings.

Jan. 28, Stanolind Oil & Gas Co. met Humble in Hendrick field, Winkler county.

Jan. 28, Texas Co. met Humble in Ward and Winkler counties, Tex., and Lea County, N. M.

April 20, 1937, Sinclair Prairie met Humble in Ward and Winkler, Tex. and Lea, N. M., counties, except that its gravity schedule ends with 36 and above, at $1.00.

Posted by Continental Oil Co.

(Effective Jan. 28, 1937)

Artesia, Jackson and Maljamar pools, N. M...$0.90

COLORADO

(Posted by Continental Oil Co., Effective Jan. 28, 1937)

Ft. Collins and Wellington

Below 29	$1.01	35-35.9	$1.15
29-29.9	1.03	36-36.9	1.17
30-30.9	1.05	37-37.9	1.19
31-31.9	1.07	38-38.9	1.21
32-32.9	1.09	39-39.9	1.23
33-33.9	1.11	40 & above	1.25
34-34.9	1.13		

Cannon City and Florence, Col.....$1.10

SOUTH AND SOUTHWEST TEXAS

All Shown Below Posted by Humble Oil & Refining Co.

(Effective Jan. 28, 1937)

Carroll, Clark, Darst Creek, Hilbig, Salt Flat and Zoboroski fields.....$1.09
Pettus.....$1.37 Van Zandt.....$1.10

Jan. 28, Magnolia met Humble in Darst Creek; posted $1.00 in Luling; $1.12 in Lytton Springs; $1.27 for Cleveland, and $1.15 in Hardin, both in Liberty county, Tex.

Jan. 28, 1937, The Texas Co. met Humble in Darst Creek.

Anahuac, Dickinson, Flour Bluff and Turtlebay

(Effective Jan. 28, 1937)

Below 31	$1.16	36-36.9	$1.28
31-31.9	1.18	37-37.9	1.30
32-32.9	1.20	38-38.9	1.32
33-33.9	1.22	39-39.9	1.34
34-34.9	1.24	40 and above....	1.36
35-35.9	1.26		

Conroe, Raccoon Bend (Deep sand crude) Tomball and Satsuma

(Effective Jan. 28, 1937)

Below 29	$1.20	35-35.9	$1.34
29-29.9	1.22	36-36.9	1.36
30-30.9	1.24	37-37.9	1.38
31-31.9	1.26	38-38.9	1.40
32-32.9	1.28	39-39.9	1.42
33-33.9	1.30	40 & above	1.44
34-34.9	1.32		

Jan. 28, Magnolia met Humble in Tomball and Texas Co. met Humble in Conroe, beginning with 35-35.9 gravity.

(Continued on next page)

CRUDE OIL MARKETS

(Continued from preceding page)

South-Southwest Texas (cont'd)

Posted by Humble

***Mirando**

(Effective July 6, 1937)

Below 21	$0.96	31-31.9	$1.18
21-21.9	0.98	32-32.9	1.20
22-22.9	1.00	33-33.9	1.22
23-23.9	1.02	34-34.9	1.24
24-24.9	1.04	35-35.9	1.26
25-25.9	1.06	36-36.9	1.28
26-26.9	1.08	37-37.9	1.30
27-27.9	1.10	38-38.9	1.32
28-28.9	1.12	39-39.9	1.34
29-29.9	1.14	40 & above	1.36
30-30.9	1.16		

*Includes Duval, Jim Hogg, Webb and Zapata counties, Tex. and Heyser and Placedo crudes.

July 6, Magnolia posted same schedule as Humble in Mirando.

July 6, 1937, Texas Co. posted for Duval-Mirando, $0.96 for below 21, plus 2c differential, to $1.12 for 28 & above.

LOUISIANA-ARKANSAS

Posted by Standard Oil Co. of Louisiana

	*N. La.-Ark.	Rodessa, La.	So. La. Roanoke N. Crowley
	(Effective Jan. 28, 1937)		(Dec. 28,'37)
Below 21°	$0.90	$0.93	$0.90
21-21.9	for	for	.93
22-22.9	oil	oil	.96
23-23.9	Below	Below	.99
24-24.9	25°.	25°.	1.02
25-25.9	$0.92	$0.95	1.05
26-26.9	.94	.97	1.08
27-27.9	.96	.99	1.10
28-28.9	.98	1.01	1.12
29-29.9	1.00	1.03	1.14
30-30.9	1.02	1.05	1.16
31-31.9	1.04	1.07	1.18
32-32.9	1.06	1.09	1.20
33-33.9	1.08	1.11	1.22
34-34.9	1.10	1.13	1.24
35-35.9	1.12	1.15	1.26
36-36.9	1.14	1.17	1.28
37-37.9	1.16	1.19	1.30
38-38.9	1.18	1.21	1.32
39-39.9	1.20	1.23	1.34
40 & above	1.22	1.25	1.36

*Includes Caddo, Homer, Haynesville, Sabine, De Soto, Sarepta, Carterville, El Dorado, Bunkie and Miller county.

Smackover, Ark. $0.90

Urania, La. (Arkansas Fuel Oil Co., Jan. 28, '37) $1.02

Tepetate, La. (Continental Oil, Jan. 28, '37) ... 1.24

Jan. 28, 1937, Magnolia met S. O. La.'s No. La.-Ark. gravity and price schedule in Pine Island, Haynesville, Bull Bayou and Cotton Valley, La., and in Eldorado and Rainbow districts, Ark.; and met S. O. La.'s Rodessa prices; and in Lockport, Iowa, Cameron Meadow, La., posted Humble's gravity and price schedule on Mirando. El Dorado East Field, Ark. price same as Smackover, effective Jan. 28, '37.

Jan. 28, The Texas Co. met S. O. La. in N. La., except that its gravity schedule begins with below 27 at $0.94. It posted $1.37 for Garden Island, La., $1.24 for LaFitte, La. and $0.90 for Smackover.

***GULF COASTAL FIELDS**

Posted by Humble Oil & Refining Co. and The Texas Co.

	(Effective Jan. 28, 1937) Humble	Texas	Saxet (Humble) (July 6 '37)
Below 18	$0.95	$0.90	....
18-18.9	for	0.92	....
19-19.9	below	0.94	....
20-20.9	21°	0.96	$1.01
21-21.9	0.98	0.98	1.03
22-22.9	1.01	1.01	1.05
23-23.9	1.04	1.04	1.07
24-24.9	1.07	1.07	1.09
25-25.9	1.10	1.10	1.11
26-26.9	1.13	1.13	1.13
27-27.9	1.15	1.15	1.15
28-28.9	1.17	1.17	1.17
29-29.9	1.19	1.19	1.19
30-30.9	1.21	1.21	1.21
31-31.9	1.23	1.23	1.23
32-32.9	1.25	1.25	1.25
33-33.9	1.27	1.27	1.27
34-34.9	1.29	1.29	1.29
35-35.9	1.31	for	1.31
36-36.9	1.33	oil	1.33
37-37.9	1.35	34°	1.35
38-38.9	1.37	and	1.37
39-39.9	1.39	above.	1.39
40 and above	1.41	....	1.41

†Refugio

(Effective July 6, 1937)

Posted by Humble

20-20.9	$1.01	23-23.9	$1.07
21-21.9	1.03	24-24.9	1.09
22-22.9	1.05	25-25.9	1.11

Rest of schedule same as Humble's Gulf Coastal crude prices.

†Includes Saxet, Greta, O'Connor-McFadden, Taft, Plymouth and Tom O'Connor crude.

*Humble's prices apply in these Texas fields: Amelia, Barbers Hill, Goose Creek, Hull, Liberty, Mykawa, Orange, Pierce Junction, Raccoon Bend, (shallow sand), Sugarland, Thompsons, and West Columbia.

Jan. 28, Sinclair-Prairie met above Humble schedule in full.

July 6, 1937, The Texas Co. posted for Refugio, which includes Greta, Saxet and Taft: $1.01 for below 21, plus 2c differential, to $1.17 for 28 & above.

Texas Co. postings in Gulf Coastal Texas include: Arriola, Five Corners, Ganado, Humble, Liberty, Magnet, Manvel, Markham, Mauritz, McFaddin, Pickett Ridge, Port Neches, Sour Lake, West Columbia and Withers. In Gulf Coastal Louisiana: Bay St. Elaine, Caillou Island, Dog Lake, Four Isle, Gillis, Horseshoe Bayou, Iberia, Lake Barre, Lake Pelto, Leesville and Port Barre.

ROCKY MOUNTAIN FIELDS

Posted by Stanolind Oil & Gas Co.

(Effective Jan. 28, 1937)

Salt Creek, (except Tensleep crude), Midway and Dutton Creek, Wyo., same schedule as Stanolind posts in Oklahoma, Kansas which see under Mid-Continent crude on previous page.

(Effective Jan. 6, 1938)

Tensleep, Salt Creek field	$0.70

(Effective Jan. 28, 1937)

Greybull-Torchlight	$1.30
Iles, light, Col	1.18
Iles, heavy	1.12
Hogback, N. M.	1.33
Big Muddy	1.23
Elk Basin, light	1.30
Grass Creek, light	1.30
Frannie light	0.82

(Effective Nov. 4, 1936)

Grass Creek, heavy	$0.62
Frannie heavy	0.62
Hamilton Dome, Wyo.	0.57

Posted by Ohio Oil Co.

(Effective Jan. 28, 1937)

Elk Basin, Wyo.	$1.30
Grass Creek, light	1.30
Rock Creek	1.205
Lance Creek	0.97

(Effective Nov. 16, 1937)

Sunburst, Mont.	$0.90

Posted by Continental Oil Co.

(Effective Jan. 1, 1938)

Cat Creek, Mont.	$1.30

(Effective Jan. 28, 1937)

Big Muddy, Wyo.	1.18
Lance Creek, Wyo.	0.97

CALIFORNIA, *Posted by Standard Oil of California*

All gravities above those quoted take highest price offered in the field. Prices effective Feb. 26, 1936, except Huntington Beach, Playa del Rey, Santa Fe Springs, Kern Front, Signal Hill (Long Beach) effective March 7, 1936; Elk Hills effective June 22, 1936; Lakeview Area, Aug. 19, 1936; El Segundo and Wilmington, Oct. 15, 1937; Greeley-Canal, Dec. 22, 1937.

Gravity	Signal Hill (Long Beach) El Segundo †Wilmington	Seal Beach	Alamitos Heights	Huntington Beach	Inglewood	Playa del Rey	Olinda Brea Canon	Athens Rosecrans	Dominguez	Torrance	Richfield	Whittier East Coyote (La Habra)	Montebello	West Coyote Hills	Santa Fe Springs	‡Newhall and others	Mountain View	Elk Hills	Buena Vista Hills Midway-Sunset Lakeview Area	Greeley-Canal (Kern County)	Lost Hills	Coalinga	Wheeler Ridge
14-14.9	$0.80	0.79	0.74	0.78	0.79	0.80	0.76	....	....	0.80	0.76	0.76	0.77	0.78	....	0.70	....	0.70	0.70	.....	0.70	0.70	....
15-15.9	.80	.79	.74	.78	.79	.80	.76	....	....	.80	.76	.76	.77	.78	....	.70	....	.70	.70	.....	.70	.70	....
16-16.9	.80	.79	.74	.78	.79	.80	.76	....	....	.80	.76	.76	.77	.78	....	.70	....	.70	.70	.....	.70	.70	....
17-77.9	.80	.79	.74	.78	.81	.80	.76	....	....	.80	.76	.76	.77	.78	....	.70	....	.70	.70	.....	.70	.70	....
18-18.9	.80	.79	.74	.78	.84	.80	.78	....	....	.82	.76	.76	.77	.78	....	.70	....	.70	.70	.....	.70	.70	....
19-19.9	.82	.79	.74	.82	.87	.84	.81	....	....	.85	.76	.78	.77	.78	....	.70	.70	.74	.74	.....	.74	.71	.70
20-20.9	.85	.79	.74	.85	.90	.88	.84	....	....	.88	.78	.82	.77	.80	....	....	.70	.78	.78	.....	.78	.72	.70
21-21.9	.88	.79	.74	.89	.93	.93	.88	....	....	.91	.80	.85	.77	.84	.78	....	.73	.82	.82	.....	.82	.74	.70
22-22.9	.92	.82	.74	.92	.96	.98	.92	....	....	.93	.84	.89	.79	.88	.78	....	.77	.87	.87	.....	.86	.78	.72
23-23.9	.95	.86	.77	.96	.99	1.02	.96	.84	.79	.96	.88	.93	.82	.92	.78	....	.80	.92	.92	.....	.90	.82	.76
24-24.9	.99	.91	.80	1.00	1.02	1.06	.99	.88	.81	.99	.91	.96	.85	.96	.82	....	.84	.97	.97	.....	.94	.86	.79
25-25.9	1.03	.95	.82	1.03	1.05	1.11	1.03	.93	.83	1.02	.95	....	.89	.99	.86	....	.88	1.01	1.01	.....	.98	.90	.83
26-26.9	1.06	1.00	.85	1.07	1.09	1.16	1.06	.98	.86	1.05	.98	....	.92	1.03	.90	....	.91	1.06	1.06	.....	1.02	....	....
27-27.9	1.10	1.05	.88	1.11	1.12	....	1.10	1.03	.88	....	1.02	....	.96	1.06	.95	....	.95	1.10	1.10	$0.84	1.06	....	....
28-28.9	1.14	1.10	.90	1.14	1.15	....	1.14	1.07	.90	....	1.06	....	.99	1.10	.99	....	.99	1.15	1.15	.88	1.10	....	....
29-29.9	1.17	1.15	.93	1.18	1.18		1.17	1.12	.93	....	1.09	....	1.03	1.14	1.03	....	1.02	1.20	1.20	.92	1.14	....	....
30-30.9	1.21	1.19	.95	1.22	1.21		1.21	1.17	.95	....	....	....	1.07	1.17	1.08	....	1.06	1.25	1.25	.95	1.18	....	....
31-31.9					1.24		1.24	1.22	.97	....	....	....	1.11	1.21	1.12	....	1.09	1.29	1.29	.99			
32-32.9		*Elwood Terrace		....	1.27		1.27	1.27	1.00	....	....	....	1.14	1.25	1.16	....	1.13	1.34	1.34	1.03	Kettleman Hills		
33-33.9	....	1.28	....	....	....		....	1.32	....	....	....	....	1.18	1.28	1.20	....	1.17	1.38	1.38	1.07	....	1.19	....
34-34.9	....	1.32	....	....	....		....	1.37	....	....	....	....	1.22	1.32	1.25	....	1.20	....	....	1.11	....	1.23	....
35-35.9	....	1.35	....	....	....		....	1.42	....	....	....	....	1.25	....	1.29	....	....	....	....	1.15	....	1.27	....
36-36.9	....	1.39	....	....	....		....	1.46	....	....	....	....	1.29	....	1.33	....	....	....	....	1.19	....	1.31	....
37-37.9	....	1.43	....	....	....		....	1.51	....	....	....	....	1.32	....	1.37	....	....	....	....	1.23	....	1.35	....
38-38.9	....	....	....	....	....		....	1.56	....	....	....	....	1.36	....	1.42	....	....	....	....	1.27	....	1.39	....
39-39.9	....	....	....	....	....		....	1.61	....	....	....	....	1.40	....	....	....	....	....	....	1.31	....	1.43	....
40-40.9	....	....	....	....	....		....	1.66	....	....	....	....	1.43	....	....	....	....	....	....	1.34	....	....	....
41-41.9	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1.38	....	....	....
42-42.9	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1.41	....	....	....
43-43.9	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1.45	....	....	....
44-44.9	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1.49	....	....	....
45-45.9	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1.53	....	....	....
46-46.9	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1.56	....	....	....
47-47.9	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1.60	....	....	....
48-48.9	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1.64	....	....	....

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Coming Meetings

Kansas Oil Men's Assn., 24th annual convention and oil exposition, Hotel Broadview, Wichita, Kans., Feb. 14 and 15.

American Institute of Mining and Metallurgical Engineers, annual meeting, Engineering Societies Bldg., New York, N. Y., Feb. 14 to 18.

Illinois Petroleum Marketers Assn., Pere Marquette Hotel, Peoria, Ill., Feb. 16 and 17.

Association of Highway Officials of the North Atlantic States, Hotel Ambassador, Atlantic City, N. J., Feb. 16, 17 and 18.

American Petroleum Institute, Division of Production, Mid-Continent District, Herring Hotel, Amarillo, Tex., Feb. 17 and 18.

Ohio Petroleum Marketers Assn., fifteenth annual meeting, Hotel Deshler-Wallick, Columbus, Ohio, Feb. 22, 23 and 24.

Wisconsin Petroleum Assn., Schroeder Hotel, Milwaukee, Wis., Feb. 22, 23 and 24.

Indiana Independent Petroleum Assn., Spring Convention and Refiners and Suppliers Exhibit, Hotel Severn, Indianapolis, Ind., March 2, 3 and 4.

Iowa Independent Oil Jobbers Assn., and trade exhibit, Fort Des Moines Hotel, Des Moines, Iowa, March 2, 3 and 4.

American Society for Testing Materials, Spring Regional Meetings and Group Committee Meetings, Seneca Hotel, Rochester, N. Y., March 7 to 12.

Society of Automotive Engineers, National Aeronautic Meeting, Mayflower Hotel, Washington, D. C., March 10 and 11.

American Assn. of Petroleum Geologists, 23rd annual meeting, Roosevelt Hotel, New Orleans, La., March 16 to 18.

Western Metal Congress and Exposition, Biltmore Hotel, Los Angeles, Calif., March 21 to 25. (Petroleum Division has sessions.)

American Society of Mechanical Engineers, Los Angeles, Calif., March 23, 24 and 25.

American Petroleum Institute, division of production, spring meeting, southwestern district, Blackstone Hotel, Fort Worth, Texas, March 24 and 25.

Michigan Petroleum Assn., Statler Hotel, Detroit, March 24 and 25.

Society of Automotive Engineers, National Passenger Car Meeting, Hotel Statler, Detroit, Mich., March 28, 29 and 30.

Independent Oil Men's Assn. of New England, annual convention, Bradford Hotel, Boston, Mass., April 7.

National Petroleum Assn., Cleveland, Ohio, April 13 to 15.

Petroleum Industry Electrical Assn., Rice Hotel, Houston, Texas, April 13, 14 and 15.

American Petroleum Institute, division of production, Eastern District, William Penn Hotel, Pittsburgh, Pa., April 14 and 15.

American Chemical Society, Dallas, Texas, April 17 to 21.

American Petroleum Institute, division of production, Pacific Coast district, spring meetings, Biltmore Hotel, Los Angeles, Calif., April 19.

American Institute of Mining and Metallurgical Engineers, Open Hearth Conference, Buffalo, N. Y., April 20, 21 and 22.

Western Petroleum Refiners Assn., 26th annual meeting, Hotel Arlington, Hot Springs, Ark., April 25, 26 and 27.

Natural Gasoline Assn. of America, 17th annual convention, Hotel Tulsa, Tulsa, May 11 to 13.

National Oil Scouts Assn. of America, Tulsa, Okla., May 12, 13 and 14.

International Petroleum Exposition, Tulsa, Okla., May 14 and 21.

American Petroleum Institute, mid-year meeting, Allis and Lassen Hotels, Wichita, Kans., May 23, 24 and 25.

Society of Automotive Engineers, summer meeting, The Greenbrier, White Sulphur Springs, W. Va., June 12 to 17.

Pennsylvania Grade Crude Oil Assn., William Penn Hotel, Pittsburgh, Pa., June 16, 17 and 18.

American Society of Mechanical Engineers, St. Louis, Mo., June 20 to 24.